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Projected Level of Supply, Demand, and Trade of Agricultural Products in 1965 and 1975

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AS refers to Austrian shilling.

A labor unit represents one male full-time worker, age 16-55.

All units of measurement refer to metric system.

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AUSTRIA: PROJECTED LEVEL OF SUPPLY, DEMAND, AND TRADE OF AGRICULTURAL PRODUCTS IN 1965 AND 1975

I. SUMMARY AND CONCLUSION

In undertaking this study, the Austrian Institute for Economic Research first appraised the general economic environment in which the agricultural economy will function until 1975. Second, it appraised the future output of all the important livestock products and crops produced in Austrian agriculture. This involved projections of livestock numbers, feed conversion rates, milk and meat production per animal, acreages, yields as influenced by mechanization, rates of fertilizers used, and other technical improvements as reflected in postwar trends. Third, projections of demand were developed for food, feeds and tobacco products, but not for beverages like coffee and tea, or for spices, and not for industrial raw material of agricultural origin such as cotton and wool. Finally, estimates of total domestic requirements are matched against the projections of supply from domestic production, and the future surplus or deficit position of Austria is appraised with regard to important agricultural commodities such as bread grains, potatoes, sugar, fruit and vegetables, edible oils, milk and dairy products, meats, lard and tallow, and also feed grains, protein feeds, and tobacco. The conclusion is reached that Austria is going to become increasingly self-sufficient in providing its food supply, but that it will become still more dependent on (1)imports of supplies for production, such as feeds, fertilizers, pesticides, machinery, and (2) exports of livestock products such as slaughter cattle, meat, and dairy products.

It was possible for the Institute to utilize some data already available, and additional survey data have been collected which permitted the computation of elasticities of demand with respect to prices and incomes.

1. General Development of the Austrian Economy

Since 1945, the Austrian economy has proven to be far more viable and efficient than it was between the two World Wars. The economy stagnated from 1918 until 1937. In the boom years of 1929 and 1937, the value added reached only about the level of 1913. Soon after 1945 Austria recovered from the losses suffered during World War II, and production was expanded continuously and strongly. The real gross national product of 1937 was already reached in 1949, and in 1960 it was more than twice as high. During the fifties, when the period of reconstruction nearly came to an end, the annual rate of growth averaged 5.9 percent. Among the other West European countries, such a rapid development was achieved only by Western Germany.

The economic expansion of the fifties was achieved with an almost constant labor input. The total number of employed persons was 3.3 percent (or up 107,000 persons) higher in 1960 than in 1951 despite the reduction in structural, regional, and seasonal unemployment from 1954 to 1958, and the entrance into the labor force of the age groups born in years of high birth rates. During the same period, average working hours declined according to rough estimates 1 1/2 percent. The growth of the national product was achieved almost exclusively by increased labor productivity (output per person employed or per man-hour).

The capital stock of the domestic economy has continuously increased and improved. Many of these investments proved to be very remunerative because firms could utilize technological knowledge and innovations which had accumulated during the thirties but (because of the depressions and the ensuing war) had not been fully exploited in Austria. At the same time, the educational level of the people employed in the economy had risen. The situation with respect to the domestic potential of productive forces was encouraged by favorable economic conditions on a worldwide basis such as the high level of employment in the industrialized Western countries, the active intellectual and economic communication with other countries, and most of all, the liberalization of the intra-European trade. Possibly even more important than the economic influences were the sociological and political conditions. The experiences gained both during the war and the postwar Allied occupation created a national consciousness and a feeling of solidarity which were lacking in the First Republic. The coalition of the two big political parties ensured social peace and protected the country from serious political crises. Ideologies became devaluated, and pure economic interests dominated politics as well as other areas.

It is not likely that the high growth rate of the fifties will continue to be achieved in the future. However, owing to the expected rise of the birth rate, the population will grow more rapidly. Austria will have an estimated population of 7,225,000 in 1965 and 7,463,000 in 1975. Compared with 1960, this corresponds to an increase of 132,000 (2 percent), and 380,000 (5.4 percent), respectively. The population increase will be composed primarily of children and aged people. It also has to be considered that young people will enter the labor force at an older age than in the past due to the introduction of a ninth year of compulsory school attendance and larger enrollment at the Austrian equivalent of high schools and universities. Old people will retire earlier because of the declining number of self-employed persons, who now represent about two-thirds of the working people and who have already reached the age of retirement; and conditional reduction of the retirement age for employees. This loss will presumably not be compensated by the increase of employed men and the growing share of female employees. Relatively more men will enter the age groups which suffered heavy death losses during the war. A forecast of the labor force by sex and age groups gives the same number of employed persons for 1965 as for 1960, and a decrease of 60,000 (or 1.8 percent) for 1975. This estimate is based on the assumption that the entire domestic labor force is available for the Austrian economy. International migration of labor (occupation of natives abroad and vice versa) was excluded. The labor input of the economy will probably fall in both periods (by some 9 percent until 1975) due to shorter working hours (introduction of the 40-hour week) and longer vacations (equal settlement of vacation benefits for manual and clerical workers).

Population and labor force

Year	Population		Persons employed		Labor input
	Thousands	1960 = 100	Thousands	1960 = 100	1960 = 100
1951. .	6,933.9	97.9	3,237.6	96.8	98.3
1960. .	7,083.5	100.0	3,345.2	100.0	100.0
1965. .	7,225.4	102.0	3,345.0	100.0	97.8
1975. .	7,463.3	105.4	3,285.0	98.2	90.9

The productivity of labor (output per man) also will not increase as strongly as it did in the past. The rise of productivity had already slowed down in the fifties. This tendency will continue, for in the last decade impulses caused by the reconstruction of the economy and by accumulated unsatisfied demand were still effective, but now the raw material and energy resources become less abundant. On the other hand, productivity should increase at a rate above that which has already been achieved in the past in the developed-industrialized countries. The present rate of investment has already remained on a high level for some time and is expected to continue. The strong incentive for modernization and rationalization, started after World War II, will receive even further impulses from the close relations with foreign countries (especially from the economic integration of Europe). Since the number of employed persons probably will remain unchanged or will even decline somewhat, it will be possible to use the savings of the economy entirely for raising the productivity of labor. At the same time, new consumption incentives will be created by the slowly growing population and the extended endowment of households with technical goods. On the basis of these considerations and of other factors (especially the productivity of additional investment), the average annual growth rate of labor productivity is estimated for the next 15 years at 4 percent.

Gross national product and national income

Year	Gross national product		National income		Per capita national income
	Billion AS at prices of 1951	1960 = 100	Billion AS at prices of 1951	1960 = 100	1960 = 100
1951	66.40	61.5	55.70	62.9	64.2
1960	108.00	100.00	88.60	100.0	100.0
1965	131.39	121.7	106.52	120.2	117.3
1975	190.98	176.8	154.12	174.0	164.3

Assumptions about the future development of the active labor force and of labor productivity led to the following projections of economic growth:

The real gross national product of the Austrian economy will grow until 1965 at an average annual rate of 4 percent; in the subsequent decade the growth rate will decline to an average of 3.8 percent owing to the decrease of the labor force. The gross national product (at constant prices of 1951) will increase from AS 108.0 billion in 1960 to AS 131.4 billion in 1965 and to AS 191.0 billion in 1975, which is about three-fourths above the level of 1960. These estimates refer to an economy which will be close to full employment. If the target years should coincide with periods of stagnation or depression these figures will not quite be reached. The per capita national income of the population will develop at a somewhat lower rate, viz. 3.4 percent per annum until 1975. This will be the case because the slower economic expansion will force a greater share of the output into replacement investment and, at the same time, the population will increase slightly.

2. Agricultural Production

Austrian agriculture is confronted with unfavorable natural and structural conditions. Three-fourths of the total land area is covered by the Alps or by regions of Alpine climatic conditions. In these regions there can be only cattle raising and grassland farming. Only in the climatically favored eastern part of the country does crop farming serve as the predominating type of agriculture. In many cases, the holdings are undersized and fragmented. According to the census of 1951, of the total of 432,800 agricultural enterprises, 24 percent had less than 2 hectares and 48 percent had less than 5 hectares of agricultural land.

In spite of the roughness of nature and of serious structural problems, agriculture has achieved great progress in the past decade. In 1960, the volume of agricultural output was 36 percent higher than in 1950 and exceeded the prewar level by 29 percent. During the Fifties, output rose at an average annual rate of 3.4 percent, with livestock production growing somewhat faster than the output of crops.

The successes of production are even more remarkable, particularly since agriculture has lost a considerable part of its labor force and large areas have been withdrawn from agricultural use. In 1960, only 808,000 labor units were employed in agriculture and forestry, which was 25 percent less than in 1937. 1/ The number of owners and family workers fell 16 percent and the number of hired workers fell by more than one-half. From 1951 to 1960, about 22,700 labor units or 2.4 percent of the agricultural labor force moved into other professions. 1/ Despite this trend, still more than one-fourth of the total labor force is engaged in agriculture and forestry; the average figure for all OEEC countries combined is 19 percent. In 1960, the productivity of labor (output per labor unit) was 73 percent higher than before the war; labor's annual growth rate of 6.3 percent during the fifties is greater than the progress achieved in any other sector of the economy, including industry.

1/ 14,000 owners and family workers; 8,300 hired workers.

The agricultural land area has undergone similar changes. Industrialization, reforestation of marginal land in remote regions, and the establishment of military training areas during the German occupation caused the agricultural area (arable land, gardens, meadows, and pastures) to decline from 4.3 million hectares based on the average of 1934/38 to about 3.9 million hectares in recent years. Arable land and gardens declined by more than 300,000 hectares (or 16 percent), while alpine and other pastures decreased by 106,000 hectares (8 percent).

To balance the losses of labor and land, agriculture has increasingly employed technical means of production, adopted more efficient methods of management, and made fuller use of the results of agricultural research. The use of technical tools and the improvement of managerial practices in agricultural production may be demonstrated by several examples.

Before World War II, field work was mainly done by hand and by draft animals (horses, and frequently also oxen and cows). In 1930 and 1939, only 720 and 1,074 tractors, respectively, were used by agriculture. During World War II, a violent wave of mechanization began which has continued until the present time except for a short interruption after the war, owing to scarce supplies. From 1950 to 1960, the stock of tractors rose from 14,100 to 118,800. During the fifties, the annual growth rate of tractor numbers amounted to 23.8 percent. Mechanization replaced human as well as draft animal labor. In 1960, only 199,800 animals (converted to draft animal units) were kept for draft work, about 45 percent less than in 1950, and about 48 percent below the level of 1938. Since the prewar period, the number of working horses and of draft cows has fallen by one-third and the number of draft oxen by more than three-fourths. This means that about 245,000 hectares of fodder land were released for other purposes. Furthermore, many other types of farm machinery (which in most instances are essential for the efficient utilization of tractors) have been purchased in increasing numbers. By 1960, already half of the arable land was harvested with combines. This has accelerated the harvesting process and has reduced harvesting and storage losses.

In crop production, higher levels of fertilizer application have boosted the yields per hectare. In 1959/60, domestic agriculture used 135 percent more fertilizer than in 1950/51 and 6.8 times as much as before the war. The mounting use of fertilizers has caused, until quite recently, marked yield increments, especially in the case of row crops (corn, potatoes, and sugarbeets). With regard to grain production, marginal yields have already begun to decrease owing to the spread of foot rot diseases, the declining application of manure, and the deterioration of soil quality by the use of combines. Apart from increased fertilizer application, the use of high-yielding varieties, pest control, better tillage of the soil, and more appropriate crop rotation systems have increased crop productivity. In 1960, the productivity of land in terms of crop output per hectare amounted to 27.3 quintals, 44 percent higher than on the 1934/38 average of 19 quintals. 2/

In livestock production, the turnover of stocks was accelerated, and the breeding of animals of higher productive capacities was reinforced through the promotion of artificial insemination in cattle breeding. Moreover, the feed situation has been greatly improved. The value of animal products produced per AS 1,000 of stock value was estimated for 1960

2/ Crop output measured as crops, and hay converted to grain equivalent.

as AS 1,080 (both at constant prices) which is 50 percent more than in 1934/38. Meat yields per head of cattle were 72 percent higher than before the war and per pig meat yields 30 percent higher. During the fifties, milk production per cow rose steadily at an annual amount of 62 kilograms and reached a level of 2,512 kilograms in 1960, which is 28 percent above 1934/38. On the other hand, the feed conversion rate remained remarkably stable. In 1960; about the same amount of feed was required to produce a unit of livestock product as before the war, even though the number of draft animals had declined drastically, the rate of livestock turnover was speeded up, and the productive capacity of the animals was being exploited more efficiently.

The economic and technical revolutions which Austrian agriculture has experienced since World War II have various causes. Starting from a low level, the fast growing real income of the urban population and expanding industrialization have created ready markets for agricultural produce. Market regulation measures have protected the domestic producers against foreign competition and guaranteed relatively stable returns. At the same time, the persistent shortage of labor, the availability of low-interest loans, and the price support on various means of production offered a strong incentive towards greater production efficiency. Most of all, the behavior pattern of the rural population has changed. Whereas farmers in former times adhered to the traditional ways of life and to the inherited methods of production with a skeptical view on innovations, today's farmers (especially the younger generation who were mostly educated in technical schools) appreciate modern technology and the findings of the natural sciences. The examples of progressive farms are more and more copied by holdings still being operated on old-fashioned methods. Technical equipment and modern management practices are not only being adopted for the economic efficiency, they are even becoming important factors with regard to social standing and are helping farmers to keep family and hired workers on the farm.

The forces working towards greater efficiency and wider application of modern technology in agricultural production are by no means exhausted. The significant regional and interfarm differences in efficiency levels and the still recognizable technical backwardness of Austria as opposed to the highly developed agriculture of the northwestern European countries give strong reasons to expect that further increases in productivity will occur. More tractors, farm implements, and more and better seed varieties will be used, as well as increased applications of fertilizer. Advances in breeding methods, artificial insemination, performance testing, contagious disease eradication schemes, and faster rates of turnover will all help to push up animal production further. The increases in productivity and output will in general not be as high as in the past decade. From graphical extrapolations of postwar trends, modified in the light of various technological and economic consideration, the total agricultural output in 1965 under the assumption of medium harvests has been projected to be 10 percent higher than in 1960, although in this particular year top record yields were achieved owing to favorable weather conditions. Production in 1965 will be about 23 percent higher than the level of output derived from the 7-year moving average from 1954-60 (1957 being the mean centered year) used to account for random fluctuations. This corresponds to an annual growth rate of 2.6 percent. From 1965 until 1975, agricultural output will (again assuming average yields) expand between 11 percent and 16 percent. The average annual rate of growth would then range from 1.1 percent to 1.5 percent.

Input of means of production

Year	Agricultural land area	Labor units	Tractors	Fertilizers
	1960 = 100			
1937	110.7	133.5	0.8	14.7
1951	104.0	125.2	15.1	45.8
1960	100.0	100.0	100.0	100.0
1965	98.1	89.9	130.3	132.2
1975 A	96.4	71.3	147.1	190.9
1975 B	96.4	74.9	147.1	190.9

To increase production further, more technical means of production will have to be employed. In 1975, agriculture probably will use nearly one-half more tractors, and almost twice as much fertilizer as in 1960. On the other hand, the input of the factors of production such as land and labor will diminish further. In 1965, agriculture will employ only 726,000 labor units, and in 1975, from 578,000 to 606,000 labor units will be used; the reduction vis-a-vis 1960 will be 10 percent for 1965 and 25 percent (projection A) to 29 percent (projection B) for 1975. Labor productivity will continue to increase rather strongly. Compared to the level derived from the 7-year moving average represented by 1957, (the centered year of the average for the years 1954 to 1960), labor productivity will rise in 1965 by 5 percent per year. From 1965 to 1975, the average annual rate of growth will vary between 2.9 and 3.9 percent.

Agricultural output and productivity

Year	Crop output	Livestock output	Total output	Productivity of land	Productivity of labor
1937	74.3	79.1	77.2	69.7	57.8
1951	70.4	68.3	68.8	66.2	54.9
1960	100.0	100.0	100.0	100.0	100.0
1965	105.9	112.7	110.0	112.1	122.4
1975 A	118.6	132.4	128.0	132.8	179.5
1975 B	118.6	124.2	122.5	127.1	163.5

The tendency of diminishing marginal productivity will be more pronounced for crops than for livestock products. In 1965, the volume of total plant production (including fodder production) will be 4 percent higher than in 1960 and 16 percent above the level derived from the 7-year moving average of 1957. This corresponds to an annual growth rate of 1.8 percent. Until 1975, a further total gain of 9 percent (0.8 percent per year) is expected. The productivity of land will increase by 2.2 percent per annum (p.a.) during the period from 1957 to 1965, and by a further 1.2 percent p.a. until 1975. The present yields per hectare achieved by the advanced northwestern European countries, producing under more favorable climatic conditions, will not even be reached in 1975. In grain farming, certain technical and economic factors will continue to favor the cultivation of wheat and barley at the cost of oats and rye. Of the row crops, mainly corn production will be expanded.

With regard to animal production, further slight decreases in livestock numbers are expected to be offset by higher output per animal. In 1965, total animal production will be 13 percent higher than in 1960. By 1975 it will increase between 11 and 18 percent. Average output per animal will increase 16 percent by 1965, and by 1975 output per animal should be 14 to 21 percent higher. A milk yield per cow of 3,300 to 3,600 liters was projected for 1975. This would then be equal to the present yields of Switzerland and of Western Germany.

The present projections are only valid under the assumptions that agriculture can sell its products at reasonable prices and that the income situation and the supply of credit will allow for ample purchases of technical means of production. Possible adjustments of production, which might be induced by overproduction or loosening of import controls as a consequence of steps towards European integration, have not been considered. Only where policy measures aimed at limiting supplies have already been adopted (delivery quotas for sugarbeet, considerable price discrimination between hard and soft wheat), were the possibilities for developing new market outlets taken into account.

3. Consumption of Food and Tobacco

With the beginning of the fifties, the postwar supply scarcities had been overcome. Since the end of 1950, consumers could choose almost freely their pattern of food consumption. Rationing was formally abandoned in the middle of 1953. The ample supply especially of high-grade foods and growing prosperity led to a rapidly rising demand. In 1959/60, the volume of per capita food consumption (quantities of primary commodities at constant average prices of 1952/56) was 22 percent higher than in 1950/51. In contrast, the consumption of calories rose only a little, for the physiological needs had largely been satisfied by the beginning of the fifties. Additional demand has mainly been directed towards high-grade products low in energy value. Disregarding short-run fluctuations, during the last decade the volume of food consumption increased at an average annual rate of 3.1 percent and calorie intake by 1.6 percent.

With regard to particular commodities, consumption developed along different lines. Relatively expensive foodstuffs of mostly low caloric content were consumed in larger quantities. From 1950/51 to 1959/60, per capita consumption of citrus fruit and of poultry rose nearly sixfold, and the demand doubled for vegetable fats, eggs, cream, and cheese. On the other hand, relatively cheap basic commodities rich in calories, such as bread grain products, cereals, lard, and potatoes, have been consumed in smaller quantities. Although at present more and higher-rated foodstuffs are consumed than at the beginning of the fifties, Austria has not yet reached the nutritional level of most Western European countries. The supply of animal proteins (46 grams per capita per day) and its share in total protein consumption (52 percent) are both relatively small.

During the fifties, consumption has been influenced by various factors such as rising real incomes, changing prices of food commodities in relation to the overall price level and to the prices of near substitutes, dissemination of physiological knowledge, growing urbanization, decreasing household size, increasing numbers of employed women, etc. The two factors mentioned first (the influence of rising incomes and changing prices) were investigated by means of econometric methods on the basis of appropriate statistics. The econometric investigations covered the budget surveys of urban households carried out in 1954/55, and of farm households surveyed in 1959 (cross-section analysis), as well as the time-series available of average per capita consumption (time-series analysis). The surveys investigated the influences of income and of household size on consumption (static demand elasticities in relation to income and household size). From the time-series it was possible to derive estimates of how changes in income and prices of various products and their close substitutes have affected the level of consumption (dynamic demand elasticities in relation to income and prices). The income elasticities computed from cross-section data on the one hand, and from chronological series on the other, do not always agree. Mostly, time-series elasticities were found to be higher. These differences can be explained mainly by the fact that in time-series analysis it was not always possible to separate efficiently the influence of income from the impacts of other variables, especially from changes in consumer preferences.

The strongest incentives of demand came from the increase of real income, although it is true that food consumption responds only relatively little to changes in income. The analysis of the survey data showed that urban households spend 0.55 percent more, and farm families 0.36 percent more for food, if their level of total expenditure rises 1 percent. The food consumption of rural households reacts not as strongly to income changes as the demand of urban households. Farm households consume large amounts of self-produced foodstuff which is very inelastic, but (on the other hand) the income elasticity for purchased food is considerably higher than in urban households.

Only for a few products (e. g. poultry, fancy pastries, and southern fruit) are the income elasticities above or close to unity. But real incomes have risen so rapidly (from 1950/51 to 1959/60 they rose 62 percent) that for the period under investigation even small positive income elasticities have given rise to considerable increases of demand.

In general, the influence of prices on consumption was weaker than the impact of income, and it has not always been possible to obtain genuine unbiased price elasticities. Nevertheless, in some cases changes in relative prices were found to have influenced consumption substantially. The demand for citrus fruit was stimulated greatly by the strong fall of prices after the liberalization of imports and the simultaneous rise of prices for domestic fruit. Similarly, poultry was preferred to veal on account of continuously rising veal prices, and "dairy" milk margarine marketed since 1957 had increasingly displaced butter. The cross-price elasticity of the demand for butter in relation to margarine prices, and of citrus fruit in relation to the price of domestic fruit was estimated at approximately unity; the cross-price elasticity of poultry demand in relation to veal prices was found to be even 2.0. In all these cases, demand responded rather strongly to changes in relative prices, because the availability of close substitutes offered other choices.

For various commodities, the estimated effects of the increase in income and of the shifts in relative prices can offer only a partial explanation of the trend in consumption.

The demand for citrus and other fruit, edible oils, cheese, and eggs has risen much faster in the fifties, than would have been expected on the basis of the observed price and income changes. On the other hand, consumers have curbed the consumption of lard which frequently increases with rising income. In most of the cases mentioned above it is possible to find plausible reasons for the changes which have occurred in consumer behavior. The modern theory of nutrition recommends the consumption of fruit for its high content of vitamins, minerals, and low caloric value. Vegetable fats are supposed to be better for health than fats of animal origin and are, therefore, preferred to lard. Furthermore, the growing employment of women and the haste of daily life promoted cold dinners and dishes which do not require much preparation. This, in particular, increased the consumption of cheese and eggs. The increasing incomes of juveniles raised the consumption of cream as well as sugar, including sweets.

A similar behavior pattern can be observed for tobacco consumption. In 1960, the population smoked 32 percent more by volume and 21 percent more by weight of tobacco products than in 1950 (including black market purchases). Consumers increasingly preferred cigarettes whereas the demand for tobaccos declined. Snuffs and similar products are practically not purchased anymore. The increase of tobacco consumption over the last 10 years was caused chiefly by the rise of real income. Moreover, tobacco products were relatively cheap in comparison with the overall price level.

In the fifties, real consumer expenditure on food as well as on tobacco has grown more rapidly than the revenues to producers from their sales of agricultural raw products. In 1959/60, consumers spent in real terms 30 percent more on food than in 1950/51, but the agricultural producer's share in this again had risen only 21 percent. This was reduced to 18 percent when imported products were excluded. Real expenditure for tobacco products increased 37 percent during the fifties but the quantity of raw tobacco consumed increased only 21 percent. These differences can be explained by the fact that from the additional expenditure of consumers on food and tobacco products the agrarian producers receive an increasingly smaller share. An increasing proportion flows to the transport, storing, grading, processing, refining, packaging, and distributive sectors. Urban households, especially those with rising incomes, preferred highly-processed products. On the basis of the budget survey in 1954/55, it can be shown that a 1-percent increase of total expenditure will raise the demand for agricultural raw products (excluding imported products) by only 0.36 percent, whereas the demand for services added by other sectors will rise by 0.78 percent, which is more than twice as much. There were great differences between the income elasticities at the retail level and at the farm level for animal products. With respect to farm households, there appeared to be no significant difference between both types of demand elasticities, partly because they predominantly consume self-produced foodstuffs, and partly because in rural regions supply and consumer desires have been less differentiated than in cities.

The rather strong increase of food consumption in the fifties was caused, at least to some degree, by curtailments during the war and immediately afterwards. As soon as supplies were no longer restricted, and foodstuffs were again available in peace-time quality, consumers began spending a relatively large share of their additional income on food commodities. However, the growth of consumption has noticeably slowed down, and this tendency will continue for various reasons. Disposable income will not rise as fast as it did in the past; the age structure will change in favor of children and aged people who need less food than persons in their working age; and technological progress will reduce the physical strain of the working process. In addition, the consumption of several food commodities is approaching a point of satiation and demand will, henceforth, be influenced to a lesser degree by income changes than in the past. The level of energy intake, amounting to 2,950 calories per capita per day, already exceeds the basic needs and is only a little lower than in wealthier countries with similar climatic conditions. The expected increases in the volume of food demand (consumption at constant prices) will be restricted for the larger part to relatively expensive foodstuffs of low energy value, such as fruit, vegetables, cheese, eggs, and meat. Basic food items, which are high in calories and relatively low-priced (such as flour products, potatoes, and lard), will presumably be consumed in smaller quantities.

The discrepancy between the incomes to farm producers and consumer food expenditure will continue to widen. The share of processing and distributive costs in total food expenditure, amounting at present to 40 percent, is still relatively low as compared with 60 percent in the United States. So far, hygienically packaged prepared or ready-to-serve foods, deep-frozen or canned goods, and special dietary preparations have only been bought in small quantities.

As employment of women increases and real incomes of consumers grow, installment of self-service shops and automatic food dispensers will result. Food items representing a higher proportion of added services will be demanded increasingly in Austria. In the future, the growth rate of real food expenditure will be remarkably higher than the growth rate in the volume of food consumed either in terms of primary commodities or in terms of agricultural raw products.

In the future, consumption habits will continue to change. Progress in the physiology of nutrition, new sales and advertising methods, the growing employment of women, and future income increases will modify the structure of consumption. These influences will not be as strong as in the past and, presumably, not all of these shifts will continue to move in the same directions they previously followed. If the chronological consumption trends of the fifties, were extrapolated, the result would show unreasonably high consumption levels of all those commodities which up until now have been favored by the shifts of consumer preferences, such as citrus fruit, other fresh fruit, eggs, and cheese.

These and other considerations led to the following projections of consumption which take into account total population, relative size of the urban and the farm population group, and income per capita in determining consumption. In 1965, the volume of per capita food consumption will be 5 percent higher, and in 1975 13 percent higher, than in 1959/60. Energy intake per capita per day will amount to 2,980 calories in 1965 and 3,065 calories in 1975, which will be 1 percent and 4 percent more than in 1959/60, respectively. The annual growth rates projected in per capita consumption by 1975 are 0.8 percent by volume, and 0.25 percent by calories. This will be substantially lower than during the fifties, 3.1 and 1.6 percent, respectively. In contrast, real food expenditure will increase at a rate of 1.9 percent per year as compared with 3.8 percent during the period from 1950/51 to 1959/60. The proportion of total food expenditure going to agricultural producers will decrease from 61 percent in 1959/60 to 52 percent in 1975, whereas the share of industrial and distributive sectors will increase from 39 percent to 48 percent.

Consumption of food and tobacco

	1950/51 1/	1965	1975
	1959/60 = 100 2/		
Food			
Real expenditure on food	76.9	111.4	133.3
Volume of consumption in terms of:			
Primary commodities	81.6	104.5	112.5
Agricultural raw products	82.6	105.0	113.7
Calorie intake	94.5	101.1	103.9
Tobacco products			
Real expenditure	73.1	107.0	124.7
Volume of consumption (at constant prices)	75.8	106.8	118.7
Consumption by weight	82.9	104.7	112.6

1/ Tobacco = 1950.
2/ Tobacco = 1960.

About 50 percent more citrus fruit, 39 percent more cheese, and 33 percent more butter will be consumed in 1975 than in 1959/60. Similarly, demand will be higher for fresh fruit (up 24 percent), cream (up 22 percent), meat (up 20 percent), vegetables (up 14 percent), and eggs (up 12 percent). The consumption of fats will remain unchanged, but the shift from lard to vegetable fats will continue. Consumption will be smaller than in 1959/60 for potatoes (down 9 percent), bread grain products (down 5 percent), and cereals (down 6 percent). In 1975, projected per capita consumption of flour products will be higher, but that of butter, cheese and eggs will be lower than the present levels of those Western European countries which have already reached the real income that Austria is projected to obtain in 1975.

In 1965, per capita consumption of tobacco products will be 7 percent higher by volume, or 5 percent higher by weight, than in 1960. Increases of 19 percent or 13 percent, respectively, are expected from 1965 to 1975. Demand will increasingly favor cigarettes (especially filter-cigarettes), whereas the share of other tobacco products in total consumption will decline.

Consumption of important food commodities

	1950/51	1959/60	1965	1975
	Kilogram per capita			
Flour	117.1	104.0	101.0	99.0
Potatoes	104.3	87.7	85.0	80.0
Meat	37.7	53.9	57.7	64.8
Edible oils	4.4	9.4	9.8	10.2
Lard and tallow	9.4	4.9	4.5	4.1
Butter	3.6	4.3	4.8	5.7
Cheese (including cottage cheese)	2.2	4.4	4.8	5.4
Fluid milk	151.4	161.8	163.6	166.3
Eggs (number)	86.1	206.3	216.6	231.1
Sugar	23.6	33.9	35.1	36.7
Vegetables	61.0	65.8	69.6	74.9
Fruit	50.3	56.3	61.7	69.9
Citrus fruit	2.1	12.5	14.9	18.7

The total demand for food and tobacco will increase faster than per capita consumption because in 1965 the population will be 2 percent larger than in 1960, and in 1975, 5 percent larger.

4. Composite Evaluation of Supply and Demand

During the fifties agricultural output, mainly food production, rose somewhat faster than food consumption. The average annual growth rate amounted to 3.4 percent; in terms of agricultural raw products 2.9 percent. Therefore, food requirements could increasingly be satisfied by indigenous production and food exports could be increased. In 1958/59, so far the most favorable year, 83.2 percent of the total food consumption came from domestic sources as compared to only 79.2 percent in 1937. If the quantities from domestic production which were stocked or exported are included, the net degree of self-sufficiency reached 89.2 percent. Food imports complemented domestic supplies and consisted mainly of commodities which cannot be produced domestically, such as tropical fruit, rice, and most fat raw materials. Early fruits and vegetables, which can be produced only during limited periods were also imported, as well as crops which cannot be produced in sufficient quantities such as bread grains, poultry, meat, and eggs. Imports of competitive products (e.g. cheese) gained some importance only after the partial liberalization of agrarian imports. Agricultural *exports* include mainly livestock and meat, dairy products, and small quantities of wine and fruit. In the fifties, the volume of *net food imports* (excluding stimulants and foodstuffs) at average prices prices of 1952/56 fluctuated according to harvests and stock movements between AS 2 billion and AS 3 billion; they remained over the entire period below the prewar level (AS 3.2 billion in 1937).

In the first half of the sixties the growth rates of *production* and *consumption* will diverge more than they did in the late fifties when the volume of food consumption showed symptoms of satiation and while production still rose at a relatively fast pace. According to the projections, agricultural output will increase until 1965 at an annual rate of 1.9 percent (if calculated on the basis of the 7-year moving average denoted as 1957, by 2.6 percent), while the demand for food (in terms of agricultural raw products) will rise at an average rate of 1.3 percent. After 1965, the growth rates of production and consumption should approach each other because the rise of output will increasingly be limited by the scarcity of resources.

The fast growth of production will reduce the *import demand* for food, at least until 1965. Bread grain and meat which in 1960 accounted for nearly 30 percent of total food imports will in the future be imported only in very small quantities, chiefly to meet certain quality requirements of demand and to balance seasonal fluctuations. The volume of normal import demand for 1965 was estimated at AS 3.16 billion. In 1959 and 1960, imports had amounted to AS 3.91 billion and AS 3.88 billion, but in the years before, to only AS 3 billion. A major decline of food imports cannot be expected, since in the future demand will increase for commodities which cannot be produced in Austria, or for commodities of limited production such as citrus fruit, early fruit, vegetables, and vegetable fats

The most important food commodities (excluding eggs, poultry, and quality wheat) will be produced in sufficient quantities to meet the domestic demand, and sometimes in larger quantities. Large scale *surplus problems* are hardly to be expected. In the years of average harvests, the output of bread grain will approximately cover the requirements. Temporary surpluses caused by record harvests will be put in stock or sold as feed grain. Where possible, economic policy measures should induce farmers to grow less wheat but more grain (especially barley), the production of which is far below requirements.

The surplus production of milk has caused serious problems in economic policy because dairy products can be exported only at heavily reduced prices. Fortunately, this surplus will presumably cease in a few years thanks to the rising demand for cheese, cream, and butter. Only the output of meat is expected to exceed considerably the level of domestic demand. This surplus, however, is able to meet competition on the international market because domestic meat prices are among the lowest in western Europe. Therefore, the projections impute that food exports will continue to rise significantly, until by 1975 livestock and meat will account for 72 percent of the total as compared to 43 percent in 1960.

The reduced dependence of food supply on imports will be achieved only by an increasing degree of import dependence of agricultural production. Domestic agriculture will be able to raise its output to projected levels only if more feedstuffs and fertilizer are used and if increased utilization of technology is employed. Most fertilizers have to be imported.

According to the feed balance, the 1975 demand for foreign feedstuffs will be from 100 percent to 170 percent higher than in 1960. Even if the projected import demand for foreign feedstuffs should be somewhat too high (either because domestic feed production will grow at a faster rate than was assumed, or because the efficiency of feed conversion will increase) the expected reductions of the demand for food imports will largely be offset by higher import requirements for feedstuffs.

Import requirements for important agricultural commodities

	1960	1965	1975 A	1975 B
	1,000 tons			
Meat	43.3	21.5	20.4	20.4
Bread grain	261.2	90.0	33.0	33.0
Feed grain	582.3	1,020.0	1,600.0	1,200.0
Vegetables	71.0	75.0	85.0	85.0
Fruit	155.0	150.0	170.0	170.0
Citrus fruit	87.0	108.0	139.5	139.5
Fats and oilseeds	77.7	76.3	81.5	81.5
Tobacco	7.4	10.0	11.0	11.0

Austrian agriculture will develop similarly to other West European countries of some decades ago, particularly Denmark and the Netherlands. The increasing emphasis on livestock production will enable domestic producers to meet the growing home demand for animal products and to export livestock and meat. At the same time, however, animal production will increasingly depend on foreign feed supplies. Likewise, the dependence of crop production on imported fertilizers will grow. If the supply of foreign means of production were interrupted, agricultural output would rapidly decline; this situation occurred during both world wars.

In general, the projections contained in this study are valid only under the assumption that future home markets for agricultural products will be controlled by means of market regulations, and that domestic agriculture will be protected against foreign competition. This working hypothesis will probably have to be modified as realization of European integration proceeds. The possible consequences of an association with the Common Market are not yet predictable, since the agricultural policy of the European Economic

Community (EEC) at the time of the study was only in draft form and the conditions for becoming an associate member had not been set up. Livestock farming, especially in the western parts of the country, would undoubtedly derive great benefits from an association of Austria with the EEC. The optimistic projections of animal output in 1975 will be reached only if Austria has the opportunity to sell livestock and meat without any considerable discrimination on the adjacent Italian and German markets. By contrast, the producers of several plant products, such as wine, fruit, and vegetables, would probably encounter difficulties of adjustment.

II. GENERAL ECONOMIC GROWTH

An attempt is made in this chapter to present a fairly comprehensive treatment of the general Austrian economy and to evaluate those factors which will determine the changes in consumer income and the growth in the population and labor force. An attempt to appraise the Austrian agricultural economy has been made by taking account of the probable population and labor force growth, employment levels, hours worked, and trends in output per man-hour and per unit of capital investment in order to determine the growth of gross national product.

1. Population Projections

When this study was planned early in 1959, the only available data on the future development of the Austrian population were contained in an estimate of the Central Statistical Office dating from 1953. 3/ This estimate was based on the census of 1951, but only a few years later it was found to be in need of revision, mainly because the birth rate had been grossly underestimated. It was, therefore, necessary to work out a new estimate based on population data for 1958, classified by age and sex. In 1960, the Statistical Office published a second estimate 4/ which differed only slightly from the results worked out in the present study for the year 1965.

1.1 Population Increase Since 1910

In 1910 the Austrian population numbered 6,648,311 (present Austrian territory), and in 1961 it numbered 7,060,133 (provisional result of the census of 1961). This absolute increase of 411,822 persons in a period of more than half a century corresponds to an average annual rate of growth of 0.07 percent. From 1934 to 1951 the annual rate of growth averaged 0.15 percent, and in the last decade it was 0.19 percent. The slow growth of population was partly the result of the heavy loss of human lives suffered in two world wars. Also there was a very low birth rate, especially in the interwar period and immediately after World War II. The modest increase that did take place was largely due to the increase in life expectancy resulting from medical progress. Accordingly, there has been a shift in the age structure of the population. The proportion of children under 15 years decreased from 29.9 percent in 1910 to 21.6 percent in 1961, while that of the aged (65 and over) increased from 6.0 to 11.7 percent during the same period. Although the birth rate started climbing in the fifties, future population growth is still expected to be relatively modest.

1.2 Population Projections for 1965 and 1975

When classified by age and sex, the population figures for 1958 (carried forward from the 1951 census figures) served as a starting point for the population projections for the

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3/ Statistische Nachrichten, vol. VIII, 1953, No. 5, pp. 175-178.
4/ Statistische Nachrichten, vol. XV, 1960, No. 3-4, pp. 138-140.

present study. To facilitate these projections, two types of information were utilized, namely:

(i) Expected population decline due to mortality;
(ii) Expected population increase due to birth.

Calculations concerning the expected population decline due to deaths were based on the general assumption that medical progress and improved living conditions will in the future reduce the specific death rates of the various age classes for men and women by the same annual percentage as in the last decade (table 1). Births were estimated as the number of women of reproductive age (15 to 45) times the fertility rate. Fertility rate referred to the number of babies born alive in proportion to the number of women of reproductive age (table 2).

Concerning the details of the methodology used to estimate and project the specific death rates by age classes, six main steps were involved. First, the mortality statistics for the years 1930-33 (midyear, half way between 1931 and 1932) and 1949-51 (midyear 1950) were used to calculate the percent decline in the specific death rates over the period covering 18 1/2 years. Second, the percentage declines over the 18 1/2 years calculated above were extrapolated in a linear fashion from 1950 (the last year for which mortality statistics were available) to the midyear of the period 1958-65 (a 12-year period), and further to the midyear of the period 1965-75 (a 20 1/2 year period). 5/ Third, the extrapolated figures for the estimated decline in death rates were adjusted to reflect important medical considerations. 6/ Since corrected percentages were deduced from the specific death rates according to the mortality statistics, average death rates were obtained for the periods 1958-65 and 1965-1975. Fourth, special assumptions had to be made with respect to infant mortality which is much higher in Austria than in most developed industrial countries but has rapidly declined by almost one-third from 1950 to 1957. For the

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5/ The extrapolations were made as follows:

$$\text{\% decline from 1950 to midyear of 1958-65} = \left(\text{\% decline from 1931-1/2 to 1950}\right) \cdot \left(\frac{12}{18\ 1/2}\right) \quad \text{(a)}$$

$$\text{\% decline from 1950 to midyear of 1965-1975} = \left(\text{\% decline from 1931-1/2 to 1950}\right) \cdot \left(\frac{20}{18\ 1/2}\right) \quad \text{(b)}$$

6/ In first place, the assumption that the science of medicine will succeed in lowering future death rates to the same extent as it has done up to now seemed too optimistic in the long run. In the second place, allowance had to be made for the fact that the use of antibiotics has led to a large decline in the death rate of younger people. Referring to footnote 3/ above, two types of adjustment can be made (i) by using a lower factor of 19/18.5 instead of 20/18.5 in equation (a) to yield the percent decline of death rates the midyear of the second period and (ii) by setting the reductions in mortality for the age classes 1-40 (inclusive) at only 0.9 percent of the values resulting from a linear extrapolation.

period 1958-65, it was assumed that the infant mortality rate will drop 0.01 below the lowest values for 1956 (i. e., 4.8 percent for boys and 3.6 percent for girls). In the period 1965-75 a further decline of one-third appears to be possible. The figures would then be 3.2 percent for boys and 2.4 percent for girls. Even so, they would still be 50 percent higher than in Sweden. Finally, the population figures of 1958 were carried forward year by year for each class and sex separately on the basis of the average death rates for the periods 1958/65 and 1965/75. Corrections were made since population statistics covered in each age class referred to persons age t-1 years while the specific death rates of the mortality statistics referred to persons ages exactly t years.

This age discrepancy should be ignored for the age classes over 5 years, since their death rates increase only slightly with increasing age. It was assumed, therefore, that all persons in each age class have reached almost t year and the death rates for persons age t years were carried forward. A more exact calculation was required with respect to children under 5. For one-half of the classes from 1 to 5 years, extrapolation was based on the death rates of those aged t-1 years; for the other half, extrapolation was based on the death rates of those aged t years. The size of the class under 1 year was estimated from average births of the current and the preceding year. At the time of the census of 1951, the infant mortality rate was 0.885 for the first half year of life and 0.115 for the second half of the first year of life. The same mortality rates were assumed for the period 1958-65, but rates of 0.9 and 0.1 (respectively) were assumed for 1965-75 in conjunction with a generally declining infant mortality rate.

Concerning the details of the methodology used to estimate and project the future population increase due to birth, three main steps were involved. First, the number of women of reproductive age (between 15 and 45) was calculated for each year of the period in question by eliminating from the total the age class at the upper limit of the range and adding the class just entering into the range (after elimination of deaths). It was necessary to do this on an annual basis because the number of women of reproductive age varies greatly from year to year. According to the estimates, the number of women of reproductive age reached a minimum in 1960, will rise until 1964, decline again until 1971, and then turn upward once more. Second, a fertility rate of 0.081 was selected for women of reproductive age which corresponds roughly to the average of the years 1956 to 1958 and may be considered to be on the conservative side. Fertility rates are extremely difficult to project. At the time of the census of 1951 they were very low but have been rising rather steadily since that time. It was supposed that the rising birth rate of the fifties was a unique phenomenon and that future development will show only cyclical oscillations around a fairly stable average. Considering the high fertility rates of the years 1959 and 1960 (0.085 and 0.086) as well as certain other indications, a slight rise in the future fertility rates appears possible. At a rate of 0.085, the population would exceed the projection for 1975 made in this study by 0.5 percent (or 36,000 persons). Third, the number of women of reproductive age was multiplied by the fertility rate to yield the estimated number of live births and these in turn were adjusted for infant mortality to yield the net population increase due to birth. The different age composition of the women and its influence on the fertility rate could not be taken into account. The estimate of the sex differentials among those born alive was based on the average sex balance in the period from 1953 to 1957 (51.35 percent boys).

Table 1. – Estimated annual death rates 1/ of the various age groups of people, specified past years and projections for 1965 and 1975, Austria

Age group (years)	Men					Women				
	1906/10	1930/33	1949/51	1958/65	1965/75	1906/10	1930/33	1949/51	1958/65	1965/75
Up to 1 year	219.8	115.4	75.2	48.0	32.0	183.1	92.5	58.4	36.0	24.0
1 but less than 5	53.0	14.0	5.6	3.6	2.5	52.1	13.1	4.9	4.1	2.1
5 " " " 10	10.1	3.4	1.4	0.9	0.6	10.2	3.4	1.9	0.7	0.5
10 " " " 20	3.0	1.9	0.8	0.5	0.4	2.7	1.8	0.6	0.3	0.2
20 " " " 30	6.7	3.7	2.3	1.8	1.5	6.7	3.3	1.3	0.9	0.6
30 " " " 40	7.2	4.4	2.5	1.9	1.5	8.2	4.0	1.8	1.2	0.9
40 " " " 50	11.0	7.0	4.0	2.9	2.2	9.9	5.1	3.0	2.2	1.7
50 " " " 60	18.0	13.0	10.1	8.6	7.7	13.4	9.4	6.2	4.9	4.1
60 " " " 70	34.4	26.7	23.4	21.5	20.4	30.1	19.9	13.7	11.0	9.3
70 " " " 80	73.0	60.3	53.8	50.1	47.9	68.4	51.2	40.6	35.1	31.9
80 and over	160.5	147.7	131.0	121.4	115.8	165.8	131.6	114.6	105.0	99.4

1/ Number of deaths per 1,000 persons.

Table 2. – Population increase due to birth, by sex, annual projections until 1975, Austria

Year	Women of reproductive age 1/	Live births 2/			Net annual addition to population due to birth 3/	
		Total	Male	Female	Male	Female
1956	1,471,900	115,827	59,153	56,674	–	–
1957	1,468,100	118,712	61,257	57,455	–	–
1958	1,460,800	119,755	61,326	58,429	–	–
1959	1,456,800	120,000	61,600	58,400	58,850	56,550
1960	1,453,250	117,700	60,450	57,250	58,450	56,000
1961	1,457,350	118,050	60,600	57,450	57,950	55,500
1962	1,474,050	119,400	61,300	58,100	58,350	55,950
1963	1,494,600	121,050	62,150	58,900	59,100	56,650
1964	1,505,000	121,900	62,600	59,300	59,750	57,200
1965	1,500,350	121,550	62,400	59,150	59,850	57,350
1966	1,488,300	120,550	61,900	58,650	60,350	57,650
1967	1,474,850	119,450	61,350	58,100	59,850	57,100
1968	1,461,750	118,400	60,800	57,600	59,300	56,600
1969	1,450,250	117,450	60,300	57,150	58,800	56,150
1970	1,442,100	116,800	60,000	56,800	58,400	55,750
1971	1,440,250	116,650	59,900	56,750	58,200	55,550
1972	1,444,750	117,000	60,100	56,900	58,250	55,600
1973	1,451,600	117,600	60,400	57,200	58,500	55,800
1974	1,459,950	118,250	60,700	57,550	58,800	56,150
1975	1,468,200	118,900	61,050	57,850	59,100	56,450

1/ Between 15 and 45.

2/ Estimates from 1959 onward; women aged 14-45 times fertility rate (0.081). Actual births in 1959 amounted to 124,377 and to 124,957 in 1960, thus exceeding the estimates by 4,377 and 7,257 respectively.

3/ Estimated increase due to birth when adjusted for mortality occurring before 1 year of age, computed as the average from the number of births of the current and the preceding year minus death for class under 1 year.

According to the projections presented in this report, the population of Austria will reach 7,225,400 by 1965 and will reach 7,463,300 by 1975. The breakdown of this population by age and sex is presented in table 3. The population projections for 1965 and 1975 correspond to an increase of 200,000 persons (or 0.41 percent per annum) in the period from 1958 to 1965, and a further increase of 240,000 (or 0.32 percent per annum) in the period from 1965 to 1975 (table 4). The increase will be composed primarily of children and old people. The active population (15 to 65 years), on the other hand, will decline from 1958 to 1965 by 10,000 and by 1975 to -40,000. The male part of the active population will increase in both periods by 30,000 (closing the gaps caused by the war).

Table 3. – Population projections for 1965 and 1975 classified by age and sex, Austria

Age	Projected population in 1965			Projected population in 1975		
	Men	Women	Total	Men	Women	Total
Less than 5	292,500	280,650	573,150	291,300	278,250	569,550
5 - 10	283,700	272,500	556,200	293,650	280,750	574,400
10 – 15	246,150	235,850	482,000	290,450	279,150	569,600
15 – 20	255,650	244,850	500,500	282,050	271,650	553,700
20 – 25	277,900	269,800	547,700	243,150	234,700	477,850
25 – 30	246,500	240,650	487,150	252,050	243,200	495,250
30 – 35	222,550	215,950	438,500	273,950	267,550	541,500
35 – 40	230,650	242,050	472,700	242,750	238,250	481,000
40 – 45	212,650	287,050	499,700	218,200	212,850	431,050
45 – 50	137,950	185,600	323,550	223,550	236,950	460,500
50 – 55	201,700	261,800	463,500	200,600	277,700	478,300
55 – 60	213,250	269,900	483,150	124,400	176,550	300,950
60 – 65	203,900	251,000	454,900	170,000	241,850	411,850
65 – 70	155,200	213,600	368,800	164,200	235,450	399,650
70 – 75	101,650	160,150	261,800	136,150	195,600	331,750
75 – 80	65,500	109,250	174,750	83,050	136,800	219,850
80 – 85	34,300	58,350	92,650	37,750	72,600	110,350
85 – 90	12,650	23,000	35,650	13,900	29,600	43,500
Over 90	3,100	5,950	9,050	3,850	8,850	12,700
Total	3,397,450	3,827,950	7,225,400	3,545,000	3,918,300	7,463,300

Population projections made for this study are fairly well in line with those of the Central Statistical Office. The Central Statistical Office projected a population figure for 1966 which is 23,000 higher than our figure for 1965. The difference corresponds fairly accurately to the rate of growth of 1 year. For 1976, however, the Statistical Office predicts a figure which is 60,800 lower than our figure for 1975. Taking into account the difference of 1 year, their estimate and our 1975 projection disagree by 83,000 persons (or 1.1 percent).

2. Labor Force and its Projections

The estimate of labor input is based on the following three investigations:

(1) Trends in the active labor force from 1951 to 1960.

(2) Forecast of the active labor force until 1975 based on labor force participation rates by age classes.

(3) Trends in working hours.

Table 4. - Population, by sex, specified years and projections for 1965, 1966, 1975 and 1976, Austria

Year	Male	Female	Total
All ages:			
1910	3,283,565	3,362,419	6,645,984
1934	3,248,265	3,511,968	6,760,233
1951	3,217,240	3,716,665	6,933,905
1958	3, 270,400	3,751,100	7,021,500
Projected 1965	3,397,450	3,827,950	7,225,400
" 1965 1/	3,303,402	3,725,318	7,028,720
" 1966 2/	3,415,300	3,834,000	7,249,300
" 1975	3,545,000	3,918,300	7,463,300
" 1975 2/	3,532,000	3,870,500	7,402,500
Aged 15 to under 65:			
1910	2,106,986	2,154,937	4,261,923
1934	2,194,881	2,420,200	4,615,081
1951	2,101,388	2,508,852	4,610,240
1958	2,171,300	2,510,500	4,681,800
Projected 1965	2,202,700	2,468,650	4,671,350
" 1965 1/	2,212,302	2,472,359	4,684,661
" 1966 2/	2,212,300	2,473,300	4,685,600
" 1975	2,230,700	2,401,250	4,631,950
" 1976 2/	2,225,300	2,387,300	4,612,600

1/ Central Statistical Office's 1954 projection.
2/ Central Statistical Office's 1960 projections.

2.1 Trends in the Labor Force from 1951 to 1960

Exact figures concerning the total labor force in Austria are given only in the censuses. 7/ The last data of this kind refer to June 1,1951. (Data of the census of 1961 have not yet been evaluated.) At that time there were 3,347,100 persons in the labor force (self-employed, employees, and unemployed). Out of these, 2,047,800 were men and 1,299,200 women. In order to estimate the development since that time, statistical data had to be gathered from various sources and to be related to the census figures.

According to the census of 1951, the number of employees was 2,088,800 (table 5). Social insurance statistics, however, recorded only 1,995,600 insured employees for the same year, that is 93,200 less. On the other hand, according to the census, the number of

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7/ The following definitions have been adopted in this study: Total labor force = total active labor force (i. e. all employed) + unemployed. Total active labor force includes self-employed, workers, and salaried employees.

Table 5. – Employees and unemployed according to census figures and social insurance statistics on June 1, 1951, Austria
(1,000 Persons)

Item	Total		Men		Women	
	Census	Social insurance	Census	Social insurance	Census	Social insurance
I. Employees						
a. Agriculture and forestry	226.8	222.2	130.8	122.0	96.0	100.2
b. Other	1,862.0	1,773.4	1,267.5	1,220.8	594.5	552.7
c. Total	2,088.8	1,995.6	1,398.3	1,342.8	690.5	652.9
	Census	Labor exchanges	Census	Labor exchanges	Census	Labor exchanges
II. Unemployed						
a. Having had a job before, or registered as seeking work.	77.3	98.2	45.9	49.2	31.3	49.0
b. Not having held a job yet, or registered as seeking apprenticeship.	13.8	13.6	7.8	9.1	6.0	4.6
c. Total	91.1	111.8	53.7	58.3	37.4	53.6
III. Potential number of employees						
I c + II a	1/ 2,166.1	2,093.8	1/ 1,444.2	1,392.0	1/ 721.8	701.9
I c + II c	2,179.9	2,107.4	1,452.0	1,401.1	727.9	706.5

1/ Definition according to census.

unemployed was 77,300, while the labor exchange registered 98,200, 20,900 more. These differences cannot be cleared up completely. Apparently, there was a considerable number of people in 1951 who were working irregularly. Some of them may not have been liable to compulsory social insurance, others, though liable, may not have been registered for insurance by their employers. Again, others who were actually registered as unemployed may have failed to declare this in the census forms, either because they had some kind of occasional work at the moment or because they were hesitant to admit being unemployed.

For the purpose of this investigation, it was assumed,for statistical and other reasons, that the census has stated correctly the overall potential number of employees (employees plus unemployed), while the labor exchange statistics were correct with regard to the number of registered unemployed. The difference between these two figures was taken to indicate correctly the actual volume of employment. The figure thus obtained is 20,900 lower (e. g. , the difference between registered unemployed and unemployed) than the census figure and 72,300 higher than the figure in the social insurance statistics. This procedure (which reduced the census total for employees) appears to be justified because persons employed but not insured in 1951 could have worked irregularly, perhaps a few hours a day.

Starting from the value thus arrived, namely, 2,067,900 employees on June 1,1951, this figure was carried forward from year to year on the basis of social insurance statistics. However, the fact had to be considered that social insurance coverage was considerably extended in that period, primarily as a consequence of new comprehensive legislation passed in 1956. Therefore, the original figure of 72,300 for noninsured employees (corrected 1951 figure) was reduced to 60,000 for 1955 and to 40,000 for 1958-1960.

The census figure for the self-employed (including family labor) was 1,181,000 out of which 850,800 persons were engaged in agriculture, and 330,200 in other branches of the economy. The number of full-time farmers was then carried forward to 1960 on the basis of estimates of the agricultural labor force as explained in Section 1 of Chapter III. Estimates concerning the nonagricultural self-employed were based mainly on membership records (exclusive of suspended memberships) of the Federal Chambers of Commerce and Industry (Bundeswirtschaftskammer). The Bundeswirtschaftskammer is a public corporation with semiofficial status; membership in it is compulsory for owners of enterprises of all types in manufacturing and trade. The subdivisions of the Bundeswirtschaftskammer are called sections.

The following information was used in making this estimate:

Economic sector	Extrapolation of census reports of 1951 based on:
Industry	Members of the industrial sector of the Federal Chambers of Commerce and Industry.
Small Trade	Members of the small trade section.

Construction	Member of the various subdivisions of small trade section (Innungen) of the Federal Chambers of Commerce and Industry in the building trades, tilers, glazers, potters, pavers, house painters, and carpenters.
Commerce	Number of firms and subsidiaries.
Transport	Members of the transport section of the Federal Chambers of Commerce and Industry.
Services	Members of the various subdivisions of the "small trades" section of the Federal Chambers of Commerce and Industry, covering restaurant and hotel business, sanatoriums and resorts, tourist offices, movies, private theaters, private hospitals, photographers, hair dressers, barbers, dry cleaners, laundries, real estate brokers, etc.

According to our estimate the total labor force has remained fairly constant from 1951-1960 (table 6). Between 1951 and 1953 it first declined from 3,355,300 to 3,299,800 (decline of 55,500 or 1.7 percent) and then increased by 1960 to 3,433,200 (a rise of 133,400 or 4 percent). The average annual rate of increase for the period from 1951 to 1960 was, therefore, 0.26 percent. The slightly larger supply of labor in the period 1954-1958 is explained by the fact that in these years especially large birth classes left school. The total active labor force increased more than the total labor force because of the marked decrease of unemployment (structural as well as seasonal) from 1955 on. In 1960 employment reached 3,355,200 (full workers), which means a rise of 107,600 (or 3.3 percent) above the 1951 level.

The structure of the labor force has shifted markedly in favor of employees (table 7). While in 1951 there were 63.5 employees in every 100 employed persons, this figure had risen to 69.6 in 1960. At the same time the number of self-employed (including family labor) had decreased in agriculture as well as in manufacturing and trade.

2.2 Forecast of Employment Until 1975 Based on Labor Force Participation Rates By Age Classes

The proportion of the labor force in the total population aged 15 to 65 has changed only little over the last decades. According to the census of 1934, about three-fourths of the entire population aged 15 to 65 were in the labor force. In 1951, the figure was 72.6 percent. This proportion will in the future be subject to the influence of various, partly counteracting factors. On the one hand, more and more young people are going on to high schools and universities, thus entering professional life later than previously. On the other hand, more women are taking jobs. Further, the fact has to be taken into account that there will be relatively more men than women in the active age classes in the future. This will tend to push up the ratio of the labor force to total population, since a larger proportion of men than women participates in the labor force.

Table 6. – Structure of the labor force, 1951-1960, Austria
(annual averages)
(Thousands)

Items	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Normal workers										
Agriculture										
Self-employed 1/	850.8	832.1	807.4	788.7	773.4	758.1	745.3	741.0	727.4	713.0
Insured employees 2/	216.9	209.3	208.6	202.0	191.8	183.6	175.7	163.8	154.4	141.4
	1,067.7	1,041.4	1,016.0	990.7	965.2	941.7	921.0	904.8	881.8	854.4
Rest of the economy										
Self-employed 3/	330.2	323.7	322.7	317.0	316.4	316.9	314.9	310.9	310.1	310.3
Insured employees 2/	1,767.4	1,729.8	1,710.3	1,773.2	1,882.4	1,953.5	2,009.7	2,039.0	2,081.7	2,140.5
	2,097.6	2,053.5	2,033.0	2,090.2	2,198.8	2,270.4	2,324.6	2,349.9	2,391.8	2,450.8
Non-insured employees	4/72.3	69.2	66.2	63.1	60.0	54.0	49.0	45.0	42.0	40.0
Total active labor force	3,237.6	3,164.1	3,115.2	3,144.0	3,224.0	3,266.1	3,294.6	3,299.7	3,315.6	3,345.2
Registered unemployed 5/	117.7	158.0	184.6	164.8	121.8	120.2	112.9	123.9	113.1	88.0
Total labor force	3,355.3	3,322.1	3,299.8	3,308.8	3,345.8	3,386.3	3,407.5	3,423.6	3,428.7	3,433.2
Full-time workers										
Agriculture 6/	1,012.7	988.4	964.1	939.8	915.5	891.2	871.2	855.7	834.1	808.3
Rest of the economy	2,097.6	2,053.5	2,033.0	2,090.2	2,198.8	2,270.4	2,324.6	2,349.9	2,391.8	2,450.8
Non-insured employees	72.3	69.2	66.2	63.1	60.0	54.0	49.0	45.0	42.0	40.0
Total	3,182.6	3,111.1	3,063.3	3,093.1	3,174.3	3,215.6	3,244.8	3,250.6	3,267.9	3,299.1

1/1951 census figures carried forward with the aid of estimates concerning full time family labor, see table 7. 2/Statistics of the General Association of Social Insurance Institutions (Hauptverband der Sozialversioherungsträger). 3/1951 census carried forward. 4/1951:difference between employees according to census and employees according to social insurance records, minus difference between registered unemployed according to labor exchange records and declared unemployed according to the census. 5/Labor Exchange Statistics. 6/See table 7.

Table 7. – Number of persons employed, by branch of industry, specified years 1951-1960, Austria

Branch of industry	1951	1955	1960
		1,000 persons	
1. Agriculture and Forestry (full-time workers)			
Self-employed	803.8	730.8	674.0
Employees	208.9	184.7	134.3
	1,012.7	915.5	808.3
2. Industry			
Self-employed	12.5	12.5	12.2
Employees	533.6	571.3	640.0
	546.1	583.8	652.2
3. Small Industry and handicrafts			
Self-employed	123.3	108.5	95.0
Employees	259.5	277.5	306.5
	382.8	386.0	401.5
4. Building and Construction			
Self-employed	15.9	15.0	14.8
Employees	185.2	188.6	205.1
	201.1	203.6	219.9
5. Power, Gas and Waterworks			
Self-employed	0.1	0.1	0.1
Employees	17.3	20.9	24.2
	17.4	21.0	24.3
6. Distributive Trades			
Self-employed	90.7	91.1	92.7
Employees	126.0	156.6	212.1
	216.7	247.7	304.8
7. Transport			
Self-employed	10.4	10.0	11.6
Employees	143.5	140.4	153.0
	153.9	150.4	164.6

Table 7. (continued)

Branch of industry	1951	1955	1960
		1,000 persons	
8. Services			
Self-employed	77.4	79.4	83.9
Employees	502.3	526.9	599.6
	579.7	606.3	683.5

In order to quantify these various influences, some of which are running counter to each other, labor force participation rates were computed by age classes and a forecast of their future development was attempted (tables 8 and 9). 8/ This method has already been applied in other countries for the purposes of projecting the labor force potential. For example, I. Bourgeois-Pichet used this method for forecasting labor force potentials for the Common Market countries and Great Britain. See "Perspectives sur la population active europienne," Population, Vol. 3, 1953. Unfortunately, statistical data for this purpose are scarce. Labor force participation rates by age classes were given only in the census of 1951. To arrive at an estimate it was, therefore, necessary to utilize other types of records and data, as for instance, enrollment in high schools and universities, incomplete participation rates derived from social insurance statistics, e. g. , the number of insured employees of an age class as a ratio of the total population in this age class, and estimates concerning the number of self-employed plus family workers. It is this latter figure which mainly determines the extent of economic activity among persons having passed the legal retirement age.

Young people (age 14-30). The census of 1951 showed for the age class from 0 to 18 years participation rates of 13.4 percent (men) and 11.2 percent (women). The employment of children under 14 being insignificant enough to be neglected, these employment numbers may safely be related to the age group from 14 to 18 exclusively. If this calculation is carried out, the new rates obtained are 72.8 percent (men) and 60.4 percent (women). Since 1951, however, these rates have certainly decreased because of increased (and still increasing) enrollment in the Austrian version of high schools.

The Austrian school system differs structurally from the American school system. Therefore, neither the Austrian version of the high school nor its grades are equivalent to the American high school. This is true even though pupils in both Austria and the United States normally enter their respective version of the high school at age 14 or 15 and graduate at about age 18. While in 1951 only 5.5 percent of the boys and 3.0 percent of the girls from 14 to 18 years of age were enrolled in the upper grades of high school, these figures had risen respectively to 8.0 and 5.1 percent by 1958 (table 10). This corresponds to an increase of 2.5 percentage points (or almost one-half) for boys and 2.1 percentage points (almost three-fourths) for girls. The latest available data show that the number of pupils in the fifth grade (age 15) has doubled from 1951 to 1958.

8/ Labor participation rates are based on ratio of the labor force in each age class to the total number of persons in the population in the same age class.

Table 8. – Labor force participation rates of male employees, and related data, by age: 1951 and 1958, Austria
(Workers and salaried employees with the exception of federal and municipal employees)

Age 1/	1951 (1,238,596) 2/			1958 (1,327,242) 2/		
	Population (persons)	Employees (persons)	Participation rate (percent)	Participation rate (percent)	Employees (persons)	Population (persons)
14-15	84,822	23,682	27.9	30.7	32,161	104,900
16-17	86,612	51,501	59.5	67.4	81,259	120,500
18-19	92,934	61,942	66.7	73.9	93,993	127,200
20-24	244,166	164,253	67.3	67.3	145,627	216,500
25-29	223,894	148,900	66.5	69.9	163,637	234,000
30-34	167,578	107,471	64.1	65.7	147,857	225,100
35-39	194,175	119,287	61.4	60.6	122,335	202,000
40-44	240,143	144,685	60.2	60.2	88,690	147,400
45-49	253,546	142,605	56.2	57.2	128,487	224,500
50-54	231,183	120,599	52.2	47.0	130,279	277,400
55	39,671	18,878	47.6	56.9	26,738	47,000
56	37,690	17,247	45.8	53.0	24,751	46,700
57	35,676	15,872	44.5	49.7	22,623	45,500
58	34,084	14,703	43.1	48.2	20,975	43,500
59	33,094	13,386	40.4	45.0	18,642	41,400
60	31,766	11,817	37.2	41.7	16,193	38,800
61	30,711	10,292	33.5	38.7	14,181	36,600
62	30,163	9,678	32.1	35.8	12,312	34,400
63	29,608	8,792	29.7	34.0	10,922	32,100
64	28,657	7,669	26.8	31.3	9,424	30,100
65	27,465	6,040	22.0	20.3	5,755	28,400
66-69	98,215	12,166	12.4	6.3	6,305	99,600
70-74	92,051	5,369	5.8	2.9	2,896	98,200
75 and over	86,561	1,702	2.0	1.4	1,200	86,700

1/ Since social insurance records register employees by birth-year classes, the birth class population had to be estimated from the age class population.
2/ Total insured employees.

Corresponding to the increase in high school enrollment, the participation rate for boys aged 14-18 was lowered by 2.8 percentage points for the period 1951-58, and by further 5 percentage points for the period 1958-65 to the level of 65 percent. The percentage points were lowered by a little more than the increase in high school enrollment to make allowance for other types of schools (as for instance, commercial schools) which also prolong the preprofessional period. Further allowance had to be made with respect to the period 1958-65 for the large number of fifth grade pupils as noted above.

Table 9. – Labor force participation rates of female employees, and related data, by age, 1951 and 1958, Austria
(Workers and salaried employees with the exception of federal and municipal employees)

Age 1/	1951 (629,270) 2/			1958 (749,243) 2/		
	Population (persons)	Employees (persons)	Participation rate (percent)	Participation rate (percent)	Employees (persons)	Population (persons)
14-15	82,503	12,409	15.0	18.2	18,578	101,800
16-17	84,412	33,193	39.3	50.7	58,914	116,200
18-19	88,883	42,804	48.2	59.1	72,787	123,200
20-24	240,603	102,968	42.8	39.4	97,313	247,000
25-29	289,102	97,125	33.6	36.1	81,577	226,200
30-34	225,486	59,969	26.6	32.4	84,437	260,400
35-39	249,940	57,359	22.9	29.1	79,972	275,200
40-44	294,222	61,617	20.9	27.1	52,738	194,400
45-49	287,883	57,417	19.9	24.3	68,529	282,000
50-54	263,227	47,069	17.9	22.3	62,216	278,800
55	56,272	7,896	14.0	21.2	11,562	54,300
56	49,082	7,254	14.8	20.0	10,811	54,000
57	47,490	6,625	14.0	18.5	9,808	53,000
58	45,385	6,063	13.4	17.4	9,020	51,000
59	43,997	5,356	12.2	16.0	8,085	50,500
60	41,843	4,247	10.1	11.7	5,739	49,000
61	40,839	2,857	7.0	6.7	3,177	47,600
62	40,851	2,468	6.0	5.5	2,566	46,300
63	40,345	2,143	5.3	4.9	2,184	44,700
64	39,015	1,961	5.0	4.2	1,798	42,900
65	37,553	1,714	4.6	3.4	1,380	41,100
66-69	129,204	4,633	3.6	2.1	3,023	145,400
70-74	131,350	2,763	2.1	1.3	1,948	150,000
75 and over	121,493	1,360	1.1	0.7	1,081	155,100

1/ Since social insurance records register employees by birth-year classes, the birth class population had to be estimated from the age class population.
2/ Total insured employees.

Some time between 1965 and 1975, compulsory education will in all likelihood be increased from the present 8 to 9 years. Thus, an entire age class will drop out of the labor force and the participation rate of those aged 14-18 will be lowered by 25 percent (more than 16 percentage points). Since the ratio of high school pupils will rise further, this rate may drop by another 20 percentage points to the level of 45 percent.

The estimates for girls were obtained similarly. However, the decline of the participation rate on account of increased high school enrollment is offset by the increasing preference of girls to take jobs instead of doing nothing at all. (Fewer girls "sit at home").

Table 10. – High school enrollment and related data, by sex and grades, 1950-51 and 1957-58, Austria 1/

Enrollment and percent of age class		Male				Female			
		5th grade	6th grade	7th grade	8th grade	5th grade	6th grade	7th grade	8th grade
1957/58	High school enrollment	6,037	5,177	4,766	3,821	3,584	3,063	2,998	2,501
	Corresponding age class	54,300	59,200	66,300	67,200	52,600	57,000	64,000	65,100
	High school pupils in percent of their age class	11.1	8.7	7.2	5.7	6.8	5.4	4.7	3.8
1950/51	High school enrollment	2,548	2,309	2,311	2,521	1,346	1,236	1,167	1,301
	Corresponding age class	42,180	42,787	45,000	45,840	41,198	41,913	43,428	44,184
	High school pupils in percent of their age class	6.0	5.4	5.1	5.5	3.3	2.9	2.7	2.9

1/ Normally pupils in Austria enter the fifth grade at 15 and finish the eighth at 18. The Austrian school system differs structurally from the American school system. Hence, neither the Austrian high school nor its grades are equivalent to the American high school.

From 1951 to 1958, the participation rate of employed girls aged 14-15 has risen, according to social insurance statistics, from 15 percent to 18.2 percent, and that of girls aged 16-17 from 39.3 percent to 50.7 percent. On the assumption that these two countervailing tendencies will about cancel out, the overall participation rate for this age group was put at 60.0 percent for 1965, that would be about as high as in 1951 (60.4 percent). By 1965, the additional influx of girls not attending high school into the labor force will probably cease. From 1965 to 1975, a decrease of 19 percentage points in consequence of the 9th school year and 4 percentage points because increased high school attendance is expected. The level thus obtained is 41 percent.

The participation rate of men aged 18 to 30 is decreasing mainly because of the increase in the number of university students. 9/ In 1958, about 5.5 percent of all men aged from 18 to 26 were enrolled as regular students at a university (that is, 0.8 percentage points more than in 1951). This would bring down the participation rate of the entire age class of 18 to 30 by 0.5 percentage points. Table 11 shows the university enrollment for 1951 and 1958. University enrollment is expected to continue to rise. The increase in the number of university students during the next years may even be stronger than in the period between 1951 and 1958. The 1965 participation rate of men aged 18 to 30 was, therefore, put at 93.0 percent (1.1 percentage points less than in 1951), and the 1975 rate at 92.0 percent (1.0 percentage point lower than in 1965).

The proportion of women aged 18 to 30 who are studying at universities is much smaller than that of men. Their participation rate is mainly determined by their increasing propensity to enter the labor force on the one hand, and by temporary or permanent interruptions of work because of marriage and motherhood on the other. The development of the participation rates of female employees from 1951 to 1958 indicates that this age group is not all homogeneous so that a further subdivision seemed to be necessary. While from 1951 to 1958 the participation rates of employed women aged 18 to 20 and, to a lesser degree, those women aged 25 to 30 increased in consequence of the increased propensity to work, the corresponding rates of the group aged 20 to 25 decreased because of marriage and motherhood. On the one hand, more married women than previously stay in the labor force, even those with children. On the other hand, the relatively smaller number of those dropping out do so earlier, as the age of marriage is going down and the birth rate is rising. On the basis of these observations and considerations, the 1965 participation rate of girls from 18 to 20 was raised by 4 percentage points above that of 1951 (86.0 percent). For the following period it was lowered slightly, on the assumption that the tendency towards increased participation of young women will eventually find a limit. Even in 1958, the participation rate of employed women from 18 to 19 years was not much lower than that of men of the same age. Also, there will be some increase in the proportion of women university students. Hence, the participation rate of women aged 20-25 was lowered somewhat (from 71 percent in 1951 to 70 percent in 1965 and to 68 percent in 1975), while that of the age group from 25 to 30 was considerably raised (from 52 percent to 58 percent and 61 percent, respectively).

9/ In Austria, students enrolled at the university are essentially graduate students.

Table 11. —University enrollment and related data, by sex, 1951 and 1958, Austria

Sex	1951			1958		
	Population aged 18 - 26	Regular students 1/	Regular students as percent of population	Population aged 18 - 26	Regular students 1/	Regular students as percent of population
	Number of persons		Percent	Number of persons		Percent
Male	381,511	17,861	4.68	358,500	19,654	5.48
Female	400,545	4,667	1.17	349,000	5,428	1.56

1/ Winter semester.

The middle period of life (30 to 60 year). In international experience, the participation rate of men between 30 and 50 years remains almost constant. The 1951 rate (97.1 percent) was, therefore, retained throughout for the purpose of this forecast. The participation rate of men from 50 to 60 years, on the other hand, tended to decline from 1951 to 1958. This decline, however, was held in narrow limits, partly because more men over 50 are kept fit for work due to medical progress and partly because the labor shortage forces employers to hire more older workers. The participation rate of this age group was, therefore, lowered from 89.4 percent (1951) to 88.4 percent (1965) and to 88.0 percent (1975).

As to women in the middle years of life, it may be expected that a larger percentage will be entering the labor force. The participation rate of employed women aged 30 to 50 has increased from 1951 to 1958 by 6 percentage points. However, as in the case of all these incomplete participation rates, the increase is only partly genuine. Many of these additional women workers had been actually working before in the family enterprise (mainly in agriculture). If the increase in the overall participation rate from 1951 to 1958 is put at 3.6 percentage points (60 percent of the increase of the participation rate for employees), and a slightly smaller increase (3.3 percentage points) is assumed for the period (1958-1965, the participation rate for the year 1965 will be 52.3 percent as compared to 45.4 percent in 1951. For the period 1965-75, a further increase by 3.0 percentage points was assumed.

For employed women aged 50 to 60, the participation rate has risen from 1951 to 1958 by 4.5 percentage points, only little less than that of the younger women. Using the same method of computation, the overall participation rate would have to be raised from 39.8 percent in 1951 to 44.9 percent in 1965. However, the new social legislation passed at the end of 1960, provides for a gradual lowering of the retirement age. Under this legislation, women will be able, under certain conditions, to retire between the 55th and 60th year of life. The participation rate will fall to 42.6 percent by 1965 if about 5 percent of female employees in this age group (or 10 percent of all women between 55 and 60) avail themselves of this opportunity. This percentage has been assumed to be valid until 1975, the further assumption being made that the additional supply of labor will nearly cancel out the effects of the earlier retirement age.

Elderly people (60 to 85 years). The normal retirement age for men is 65 years in Austria; therefore, men aged 60 to 65 are normally still working. But the conditional lowering of the retirement age from 65 to 60 (according to social legislation of 1960) will in the future probably induce many employees to retire earlier. It was assumed that by 1965 about 10 percent of the men in these age classes will retire, and by 1975 an additional 5 percent. The participation rate falls thereby from 69.9 percent in 1951 to 63.0 in 1965 and to 59.8 percent in 1975.

The extent of labor force participation after the legal retirement age (women over 60, men over 65) depends mainly on the proportion of the self-employed, including family labor, in the total labor force. Members of this group often work until the end of their lives; in developed industrial countries they account for about two-thirds of that part of the labor force which is active beyond the normal retirement age. It is true, though, that the participation rate of the elderly self-employed is also going down at the present time, mainly because recent legislation, introducing a retirement scheme for independent farmers and small businessmen, assures them now of a modest pension. Only one-third of those working beyond the retirement age are employees. The participation rates of male employees of this group have generally gone down by one-half in the period 1951/1958.

For the purpose of this study it was assumed that the overall participation rate of persons over 65 will decrease by about 20 percent in 10 years. In this figure the present and future ratio of active and nonactive self-employed to employees has been taken into account as well as the difference in decreased rates of participation. The participation rate of the aged was lowered by 28 percent for the period from 1951 to 1965, and by a further 20 percent for the period until 1975 (table 12). For example: in the case of men aged 65-70, the participation rate for 1965 was lowered 12.2 percentage points from its 1951 level of 43.6 percent, and another 6.3 percentage points by 1975. For women aged 60-65, the decrease was estimated to be smaller (15 percent in 10 years), in accordance with the development of the participation rates of employees.

Summary. The multiplication of the estimated participation rates by age classes times the total population in the same age classes yields the projected labor force (tables 12 and 13). The size of the future labor force is projected to be 3,422,100 in 1965 and 3,358,300 in 1975--that is, about 2.2 percent and 0.3 percent, respectively, more than were counted in the 1951 census. The overall ratio of the labor force to the potentially active population (i.e. persons from 15 to under 65) will, according to this estimate, first rise from 72.6 percent in 1951 and 1958 to 73.3 percent in 1965 and then drop to 72.5 percent in 1975 (table 14). The assumed increase of this ratio in the period 1958-65 is mainly explained by the expectation that there will be more men and fewer women in this age group by 1965. The subsequent decrease follows from the lower participation rates of young people (extension of compulsory education from 8 to 9 years) and of old people (earlier retirement).

Since the labor force totals in our series refer always to the middle of the year, it was necessary to compute yearly averages taking into account the oscillations over the year. Further, the assumption was made that total average unemployment (structural and seasonal) will fall from 88,000 in 1960 to 85,000 in 1965 and to 80,000 in 1975 (table 15). It follows from this that; on the assumption of virtually full employment, the size of the

Table 12. – Austrian labor force participation rates, by age and sex, 1951 and projections for 1965 and 1975

Age group	Men			Women					
	1951 1/	1965	1975	1951 1/		1965		1975	
	Percent of age group in the labor force								
14 to under 18	72.8	65.0	45.0	60.4		60.0		41.0	
18 - 20	94.1	93.0	92.0	86.0	65.4	90.0	68.3	88.0	68.7
20 - 25				71.0		70.0		68.0	
25 - 30				52.0		58.0		61.0	
30 - 50	97.1	97.1	97.1	45.4		52.3		55.3	
50 - 60	89.4	88.4	88.0	39.8		42.6		42.6	
60 - 65	69.9	63.0	59.8	25.9		20.7		17.6	
65 - 70	43.6	31.4	25.1	19.1		13.8		11.0	
70 - 85	24.2	17.4	14.0	10.2		7.3		5.8.	

1/ According to census 1951. The participation rates for the age classes 14-18 and 70-85 were estimated. The census gives only figures for the age under 18 years old (men 13.4 percent, women 11.2 percent) and for those over 70 (men 23.0 percent, women 9.6 percent). The same is true for the subdivisions introduced in the rate of women aged 18-30, namely, the groups 18-20, 20-25, and 25-30.

total active labor force (without unemployed) will be 3,345,000 in 1965 (yearly average). This is practically the same figure as for the yearly average 1960. Compared to 1951, however, it will be 68,400 or 3.3 percent higher. From 1965 to 1975, the size of the active labor force may be expected to fall by 60,000 persons (or 1.8 percent) to a total of 3,285,000. The yearly rate of decrease in this period would then be 0.18 percent.

2.3 Development of Working Time

Statistical data as to actual hours worked exist only for industrial workers. The Austrian Institute of Economic Research publishes in its monthly survey of earnings also an index of weekly working hours of industrial workers in Vienna (including workers in large construction firms and printing shops) based on August 1938 data. In addition, since 1950 the Industrial Section of the Federal Chambers of Commerce and Industry makes available the number of paid working hours in industry for the whole country, and since 1955 this also includes hours actually worked. According to these data, the number of paid hours per worker has increased from 1951 to 1955 by 4.3 percent, a rise of 1.07 percent per annum and has fallen from 1955 to 1960 by 4.4 percent, a decline of 0.89 percent p. a. (table 16). The number of hours actually worked (which is a better basis for the computation of the volume of labor than the number of paid hours) decreased in the second period to 6.1 percent or 1.27 percent per annum. This considerable decrease from 1955 to 1960 is explained mainly by the fact that in 1959 the normal working week was reduced from 48

Table 13.- Projected number of persons in the labor force and in the potentially active population, by age classes and sex, 1965 and 1975, Austria

Age group	Men				Women			
	1965		1975		1965		1975	
	Population 1/	Labor force 2/	Population 1/	Labor force 2/	Population 1/	Labor force 2/	Population 1/	Labor force 2/
	1,000 persons							
14 to under 18	208.0	135.2	229.5	103.3	199.7	119.8	220.5	90.4
18 - 30	620.9	577.4	604.7	556.3	602.6	411.4	583.9	398.8
30 - 50	803.8	780.5	958.5	930.7	930.7	486.7	955.6	528.4
50 - 60	415.0	366.8	325.0	286.0	531.7	226.5	454.3	193.5
60 - 65	203.9	128.5	170.0	101.7	251.0	52.0	241.9	42.6
65 - 70	155.2	48.7	164.2	41.2	213.6	29.5	235.5	25.9
70 - 85	201.5	35.1	257.0	36.0	327.8	23.9	405.0	23.5
Total labor force		2,072.2		2,055.2		1,349.9		1,303.1

1/ See table 3 for projected population in 1965 and 1975.
2/ Derived from the labor force participation rates given in table 12.

to 45 hours. In the long run (1938-1960), hours of work decreased (according to the data of the Institute) by an average of 0.59 percent per annum.

On the basis of available data, the average weekly working time of industrial workers first rose from 40.6 hours in 1951 to 42.4 hours in 1955, and then fell to 39.8 hours in 1960 (table 17). These figures refer to the week regarded as 1/52 of the year; this means that absences due to illness, holidays, vacations, etc., were evenly distributed over the year. It was assumed that hours of work for nonindustrial workers and salaried employees are the same as for industrial workers.

There is no information concerning the working time of the self-employed and their families. On the assumption that their hours of work have remained constant and exceeded those of the industrial workers by 5 percent in 1960, the average weekly working hours in all types of occupations is estimated to have risen from 41.0 in 1951 to 42.2 in 1955 (a rise of 0.73 percent per annum) and then to have fallen to 40.4 by 1960 (a decline of 0.87 percent p.a.).

For the years 1965 and 1975, it was assumed that the weekly hours of work of employees will decrease by 0.5 percent per annum, e.g., about the same amount as the long-term rate from 1938 to 1960, while those of the self-employed will remain constant. This estimate makes allowance for the probable reduction of the normal working week from 45

Table 14. - Ratio of labor force to potentially active population and related data, by sex, specified periods and projections for 1965 and 1975, Austria

Date	Men			Women			Total		
	Population aged 15-65	Labor force	Labor force as percent of population	Population aged 15-65	Labor force	Labor force as percent of population	Population aged 15-65	Labor force	Labor force as percent of population
	1,000 persons		Percent	1,000 persons		Percent	1,000 persons		Percent
March 22, 1934 1/	2,194.9	2,100.6	95.7	2,420.2	1,289.2	53.3	4,615.1	3,389.9	73.5
June 1, 1951 1/	2,101.4	2,047.8	97.5	2,508.9	1,299.2	51.8	4,610.2	3,347.1	72.6
June 1, 1958 2/	2,171.3	2,047.8	94.3	2,510.5	1,352.3	53.9	4,681.8	3,400.1	72.6
Mid - 1965 3/	2,202.7	2,072.2	94.1	2,468.7	1,349.9	54.7	4,671.4	3,422.1	73.3
Mid - 1975 3/	2,230.7	2,055.2	92.1	2,401.3	1,303.1	54.3	4,632.0	3,358.3	72.5

1/ Census figures.

2/ Population of these age classes according to Statistical Office figures carried forward from census 1951. The labor force is composed as follows:

	Men	Women	Total
		1,000 persons	
Self-employed (Table 6)	541.7	510.2	1,051.9
Insured employees on June 1	1,443.8	776.3	2,220.1
Noninsured employees	28.0	12.0	40.0
Registered unemployed	34.3	53.8	88.1
	2,047.8	1,352.3	3,400.1

3/ For active population see table 4; for the labor force see table 13.

Table 15. – Composition of the labor force, specified years and projections for 1965 and 1975, Austria

Item	1951 1/	1960 1/	1965 2/	1975 2/
	1,000 persons			
Self-employed in agriculture and forestry	850.8	713.0	644.9	530.0
Other self-employed	330.2	310.3	300.0	290.0
Insured employees	1,984.3	2,281.9	2,400.1	2,465.0
Noninsured employees	72.3	40.0		
Total active labor force	3,237.6	3,345.2	3,345.0	3,285.0
Registered unemployed	117.7	88.0	85.0	80.0
Total labor force	3,355.3	3,433.2	3,430.0	3,365.0

1/ Derived from table 6.
2/ Total labor force according to table 13 re-estimated on basis of annual averages.

to 40 hours within the next 10 years. It may be expected, however, that this measure will not result in a sudden drop in actual working hours by the full amount of the reduction, but rather that the effect will be spread over a number of years. As to annual vacations it seems likely that workers will be put on equal terms with salaried employees in this respect; this would mean an additional week's vacation for the workers. Thus, the average working week of workers will decrease by 2 percent, that of all employees by 1.2 percent. On the assumption that half of these additional vacations will become effective before 1965, the following result is obtained: In consequence of the shortened working week and longer annual vacations, actual weekly hours of work of the total active labor force will decrease in the period from 1960 to 1965 by 2.2 percent (for employees by 3.1 percent) and by 1975, there will be a further decrease of 4.3 percent (for employees by 5.4 percent). The total decrease from 1960 to 1975 will amount to 7.4 percent for the total active labor force and 8.5 percent for employees. The estimate of 36.5 hours actually worked by workers and employees in 1975 corresponds approximately to a normal 40-hour week after deductions for sickness, holidays, etc., have been made.

3. Growth of the National Product

The present forecast of the Austrian national product is mainly based on an analysis of supply. An investigation will show how much the Austrian economy will be able to produce in 1965 and 1975, given a certain stock of labor and capital. For this purpose the national product was expressed one time as the product of labor volume and labor productivity, and

Table 16. – Data on working time of industrial workers, 1938-1960, Austria

Year	Workers in industry, construction and building, and printing (Vienna only) 1/	Industrial workers, entire federal area 2/	
		Paid	Worked
	Hours per week	Hours per month	
1938 (August)	51.1		
1951	--	189.0	--
1952	--	186.4	--
1953	--	187.9	--
1954	--	191.9	--
1955	46.6	197.2	183.6
1956	46.6	196.7	180.8
1957	46.5	194.7	178.0
1958	46.5	195.1	178.4
1959	45.0	189.4	172.8
1960	44.9	188.6	172.4
Annual decrease 1955-1960, in percent	0.75	0.89	1.27

1/ Series of the Institut für Wirtschaftsforschung on workers earnings.
2/ Statistics of the Industrial Section of the Federal Chambers of Commerce and Industry. For 1951-53, results were available only for 4 months. The annual averages were estimated.

Table 17. – Estimated number of working hours per week, by type of employed person, specified years and projections for 1965 and 1975, Austria

Year	Employees	Self-employed	All employed
1951	40.6	41.8	41.0
1955	42.4	41.8	42.0
1960	39.8	41.8	40.4
Projected 1965	38.6	41.8	39.5
Projected 1975	36.5	41.8	37.8

another time as the product of capital and capital productivity. 10/ Complicated procedures, such as the calculation of a production function for the entire economy, or the construction of models analysing the national product as the result of the interaction of various supply and demand factors had to be foregone because of the inadequacy and insufficient exactness of the available statistical material.

The estimate of the national product was made for a near fully-employed economy, i. e., assuming that the potential supply of goods and services attainable on the basis of the available productive forces and their efficiency will actually be produced and sold. Thus, the problem of relating the technically possible supply of goods to effective demand was regarded as solved. This implies that international economic relations will permit a policy of full employment and that European integration will not involve excessive difficulties of adjustment. This assumption appears to be justified by the experiences of the fifties. Since the stabilization of the Schilling in 1951, Austria's balance of payments has been more or less in equilibrium and the domestic industry has stood up remarkably well to stiffened foreign competition as the scope of liberalization was gradually extended.

The present forecast is based on the developing trends of the fifties. The immediately preceding years were not typical because of the reconstruction problems following the war. As regards the interwar period, the development of the thirties was so largely determined by the worldwide Great Depression that it cannot serve as a basis for prediction. The fifties were subdivided in two periods: from 1951 to 1955 and from 1955 to 1960. Both periods end in boom years. The average rates of growth computed for these periods may therefore be taken to reflect approximately the long-term growth trend, after elimination of short-run cyclical fluctuations. The analysis was based on the national income statistics worked out and published jointly by the Austrian Institute of Economic Research and the Central Statistical Office. Originally it was intended to use new and improved data, but this plan could not be realized as the revision of the national income statistics, which has been underway for a year and a half, has not yet been completed. However, the available partial results of this revision indicate that the old series give a fairly accurate picture of actual development.

3.1 Economic Growth and its Determinants in the Fifties

The Austrian economy grew remarkably fast in the fifties, but has not yet reached the level of the highly developed industrial countries of Western Europe. The gross national product in real terms (1951 prices) increased from 1950 to 1959 by 77.6 percent or 5.91

10/ The terms productivity of labor and of capital are used in their statistical sense, meaning output per man-hour and per unit of capital. They are not identical with the theoretical concepts of marginal productivity of labor and of capital which express a causal relationship between the input of one factor of production and the level resulting change in output, or associated change in output (ceteris paribus).

percent per annum. 11/ The Austrian rate of growth was higher than that of all other Western European countries with the exception of the German Federal Republic. At the official rate of exchange the per capita GNP in 1959 amounted to $733, as compared to $971 in the Common Market countries and $849 in the OEEC countries (table 18). The wealthy European countries, Sweden and Switzerland, had per capita incomes of approximately $1,500. The gap between Austria and the leading western European countries is somewhat lessened when the national currencies are converted into dollars on the basis of purchasing power parities rather than on that of the exchange rates; but even then it remains considerable.

In the fifties, the economy was subject only to minor cyclical fluctuations. There were no recessions in the usual meaning of the word (i. e., an absolute decline in gross national product over more than a year). The real gross national product was in every year higher than in the preceding one. Business fluctuations were reflected only by different growth rates and varying degrees of capacity utilization. The rate of growth ranged from 0.5 percent in 1952 to 11.0 percent in 1955 (table 19). The decade 1950-1960 was marked by three peak years: 1951, 1955, and 1960. In these years domestic factors of production were virtually fully employed and in certain sectors of the economy there were acute shortages of labor and plant capacity. In the intervals between these boom years there were short periods of slackening economic activity with a modest temporary decline in the degree of employment of resources. In 1952 and partly in 1953, when a restrictive monetary and fiscal policy was pursued in order to stop the postwar inflation and to correct the balance of payments disequilibrium, a "stabilization crisis" occurred, which was further intensified by the international recession following the end of the Korean boom. In these 2 years the real gross national product grew only by 0.5 percent and 2.7 percent, respectively. In 1958 and partly in 1959 the international recession depressed the rates of growth to 3.3 percent and 3.2, respectively.

Within the period of the fifties economic growth slowed down to some extent. If we compare the periods from 1951 and from 1955 to 1960 - both of which end in a boom year - the rate of growth of GNP fell from 6.05 percent per annum in the first to 5.16 percent p. a. in the second period, even though the recession of 1951/52 was more pronounced than that of 1958/59.

The causes for this decrease in the rate of growth can be explained more accurately if we compare the national product with the volume of labor and of capital input. Estimates of the size of the overall labor force are presented in Section 2 of this Chapter. According to these the labor force (computed on the basis of full-time workers) remained practically constant from 1951 to 1955 (with an average annual decrease of 0.07 percent), while it grew in the second period, i. e., from 1955 to 1960, by 0.77 percent per annum. This increase was partly due to the strong age classes then entering the labor force, and partly to the decrease in structural, regional, and seasonal unemployment. Moreover, a more

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11/ The annual "growth rate" of all OECD countries from 1950 to 1959 was 4.24 percent per annum and of the EEC countries 5.27 percent per annum. In general, the annual rates of growth given in the text were calculated by the compound interest formula (discontinuous compounding once a year). To simplify mathematical operations, in a few cases (marked by an asterisk*) the rates of growth were computed under the assumption of continuous compounding.

Table 18. - Growth of Gross National Product in various countries, 1950 to 1959

Country	Per capita GNP 1959	Per capita GNP Increase from 1950	GNP Increase from 1950 to 1959
	US $	Percent	Percent
U.S.A.	2,730	115.5	134.9
Sweden	1,517	127.1	135.1
Switzerland	1,503	138.1	154.0
Great Britain	1,275	119.1	123.4
Belgium	1,261	121.0	127.5
Denmark	1,213	117.7	125.3
France	1,154	133.1	143.8
German Federal Republic	1,107	172.0	189.7
Netherlands	905	133.7	150.0
Austria	733	174.8	177.6
Italy	582	156.0	164.3
OEEC Countries (Total)	849	134.5	145.5
Common Market Countries (Total)	971	147.0	158.8

1/ National currencies converted to U.S. dollars at the official exchange rates.

Source: OEEC, General Statistics.

efficient utilization of labor was achieved. The rate of unemployment (the number of registered unemployed as a percentage of total labor force) fell from 3.51 percent and 3.64 percent in 1951 and 1955, respectively, to 2.56 percent in 1960.

In spite of the increased labor force the national product grew at a slower rate in the second half of the period than in the first. It follows therefore, that the increase in production per employed person (total production divided by the number of employed, referred to as productivity of labor) had slowed down more than the growth of total production. From 1951 to 1955 the productivity of labor rose by 6.11 percent per annum, from 1955 to 1960 only by 4.35 percent (table 20). Productivity increases may stem from two different sources: First from increased productivity in various enterprises and industrial branches, second from shifts in the structure of employment toward occupations, firms, and economic branches with higher earnings (structural factor). To form a rough idea of the influence of structural factors, a calculation was made to show by how much labor productivity would have changed, if no structural movements had taken place. For this purpose productivity changes were estimated by seven branches of the economy: Agriculture and forestry, industry and manufacture, building and construction, electric power, gas and waterworks, trade and transport, public and private services. The result showed that of the total increase in productivity from 1951 to 1955, about 5.4 percent was accounted for by the increased productivity within the various branches, and 0.67

Table 19. – Gross national product, gross investment and employment, 1950 to 1960, Austria

Year	GNP in 1951 prices				Gross fixed capital investment in 1951 prices			Total employment	
	Billion schillings	Growth per annum			Billion schillings	In percent of GNP		1950 = 100	Growth per annum in percent
		Billion schillings	In percent						
	Y_t	dY_t	$\frac{100\,dY_t}{Y_{(t-1)}} = 100w_t$		J_t	$\frac{100\,J_t}{Y_t} = 100s_t$		L_t	$\frac{100\,dL_t}{L_{(t-1)}} = 100\,L_t$
1950	60.8	+ 6.5	+10.7		12.2	20.07		100.00	
1951	66.4	+ 5.6	+ 9.2	+6.05	13.9	20.93	20.58	97.75	-0.07
1952	66.7	+ 0.3	+ 0.5		13.4	20.09		96.25	
1953	68.5	+ 1.8	+ 2.7		12.0	17.52		97.19	
1954	75.7	+ 8.2	+10.5		15.5	20.48		99.74	
1955	84.0	+ 8.3	+11.0		19.8	23.57		101.04	
1956	88.5	+ 4.5	+ 5.4	+5.16	19.3	21.81	22.31	101.95	+0.77
1957	93.4	+ 4.9	+ 5.5		20.6	22.06		102.14	
1958	96.5	+ 3.1	+ 3.3		21.3	22.07		102.68	
1959	99.6	+ 3.1	+ 3.2		22.2	22.29		103.66	
1960	108.0	+ 8.4	+ 8.4		25.0	23.15			

Table 20. - The effect of structural shifts on the productivity of labor, (Percent) Austria

Period	Productivity of labor 1/.		Average productivity of economic sectors 2/		Structural shifts 3/	
	Total	Annual	Total	Annual	Total	Annual
1951/55	+26.84	+6.11	+23.50	+5.40	+2.70	+0.67
1955/60	+23.71	+4.35	+20.10	+3.74	+3.00	+0.59

1/ GNP divided by the number of employed.
2/ Average productivity of 7 economic sectors.
3/ Increase in total productivity due to shifts in employment among the 7 economic sectors.

percent by structural shifts between these branches. The corresponding rates of increase for the period from 1955 to 1960 were 3.74 percent and 0.59 percent. The structural factor would have been larger, possibly approaching 1 percent, if a larger number of subdivisions had been chosen because there were certain shifts toward more productive occupations within these seven branches as well. The slowing down of the rate of increase in overall labor productivity during the second half of the period is therefore mainly due to the slower growth of productivity within the main sectors of the economy (especially in industry and agriculture) as compared to the first half.

It seems plausible to relate the difference in the rates of growth of labor productivity (in the sense in which it is used here, namely, as output per employed person) to the amount of working time. According to the rough estimate, average working hours of all persons employed rose from 1951 to 1955 by 0.73 percent per annum, and fell from 1955 to 1960 by 0.87 percent p. a. The annual rate of increase in the productivity of labor in the first half of the period was not much greater than in the second (5.35 percent and 5.28 percent respectively). However, these figures should not be given too much weight because the estimates concerning working time are very rough indeed; also, because the shortening of the normal work week from 48 to 45 hours in 1959 was apparently compensated by greater individual effort (for example, fewer absences because of illness) and improvements in management. In any case the trend of per capita output showed no break in 1959, although effective hours of work were cut abruptly by 2.3 percent.

Similar reasoning may be applied to the question of the productivity of capital. Figures concerning the absolute magnitude of the capital stock do not exist in Austria. Research in progress, aiming at a revision of the national income data and at a computation of national wealth accounts has not yet been concluded. However, it is possible at least, to compare the increase in capital stock (investment) with the increase in national product. By relating average gross investments of the current and preceding year to the increase in gross national product of the current year, the following results are obtained: From 1951 to 1955 the increase in gross national product amounted to 30.6 units per 100 units of gross investment; from 1955 to 1960 this increase was 22.7 units. Investment productivity was, therefore, 0.306 from 1951 to 1955 and 0.227 from 1955 to 1960. The reciprocal values of these figures, yielding the incremental capital-output-ratio are 3.27 and 4.41. Thus the productivity of investment in the second half of the decade of the fifties. was lower than in the first, although employment had increased from 1955 to 1960 so that strictly speaking the entire increase in gross national product should not have been exclusively credited to increased capital input.

The decrease in the productivity of investment was partly offset by a larger rate of investment. The rate of real investment (defined here as ratio of gross fixed capital investment to gross national product) rose from an average of 20.6 percent in the period from 1951 to 1955 to 22.3 percent from 1955 to 1960. The product of the rate of investment and the productivity of investment, corresponding roughly to the rate of growth of gross national product at compound interest, amounted to 6.2 percent in the first period and to 5.1 percent in the second. 12/ The increase in the rate of investment, in real terms until 1955, nominally until 1960, is probably due mainly to certain special circumstances, as for instance the very high ratio of government savings until 1955. Further, from 1954 on, new tax legislation permitted the depreciation of new investments at a highly accelerated rate. Especially in the first years this legislation afforded considerable tax relief to the enterprises. Also notable was a temporary increase in saving by employees, due to their desire to replenish cash reserves reduced through the currency reform and inflation.

The declining trend of the productivity of investment and the slowing down of the rate of growth of labor productivity in these 10 years may partly be explained by the fact that at the beginning of this period postwar reconstruction had not yet been brought to a close. There still were numerous gaps in the productive equipment. By investment in fields where bottlenecks existed, the capacities of connected branches could be better utilized. In this way large increases in productivity could be achieved. Replacement investments also led to a marked progress in productivity, since the new equipment was much more

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12/ The mathematical relationship can be expressed as follows:

$$Y_t = Y_o e^{wt} \qquad (1)$$

$$Y_t = Y_o e^{skt} \qquad (2)$$

$$w = sk \qquad (3)$$

s = rate of investment

k = productivity of investment

y = national product

w = growth rate of national product on the basis of compound interest

(see E. D. Domar: Essays in the Theory of Economic Growth, New York, 1951, p. 75).

The calculated values of sk and w for the periods from 1951 to 1960 do not completely differ from each other since s and k had been computed only roughly as the arithmetic mean of the values of several years.

efficient than the old, some of which had been installed before the First World War. And lastly, Austria was able in this period to utilize technical progress achieved in other countries during and after the war.

3.2 Forecast for 1965 and 1975

This forecast is based on the assumption that the productivity of labor (production per employee) will rise by 4 percent per annum. This predicted rate of growth is lower than the actual rate observed from 1955 to 1960 (4.35 percent), but considerably higher than the long-run rates of growth of some developed industrial countries in the past.

A certain slowing down of growth in productivity may be expected mainly because some extraordinary factors were still at work in these last 5 years, e.g., the process of "catching up" with the technical progress of other countries and the high productivity effect of replacement investments. Further, some domestic resources of raw materials as well as energy are gradually depleting or at least reaching the point of decreasing returns. This is true for lumber, iron ore, crude oil,and natural gas.

On the other side, the rate of productivity increase should not go down drastically. In favor of this view, it may be argued that the present rate of investment (over 22 percent is largely "institutionalized") and can be expected to stay at this level unless serious disturbances occur from outside. Furthermore, the size of the labor force will remain constant through the next 5 years and even diminish slightly afterwards. The enterprises will therefore be able to utilize their gross investments (after deduction is made for replacement of obsolete equipment) almost solely to increase capital input per unit of labor and thus raise labor productivity. In the past 5 years part of the investment had to be utilized to create additional jobs for the new workers entering the labor market. Also, the development of demand may induce investments for increasing efficiency. The expected future development of population (a relatively smaller labor force and more consumers) leads to the expectation that demand will continue to be high and labor scarce. This will provide an incentive for entrepreneurs to save labor by investments which increase efficiency ("deepening of capital") and by better organization of work.

As in the past about 1 percent of the expected productivity increase of 4 percent will be due to structural shifts toward more productive branches of the economy. While the number of workers leaving agriculture to enter industry will be lower in absolute terms, thus contributing less to the increase in total productivity, the requirements of European integration may bring about further structural movements towards the more productive branches.

The assumed 4 percent rate of increase in labor productivity throughout the entire economy relates only to production per unit of labor, neglecting the expected further decrease in working hours. On the basis of the rough estimate of the decrease in working hours, output per man-hour should rise about 4.5 percent per annum.

Since the working population (labor force minus unemployed) will probably remain stable from 1960 to 1965, the rate of growth of labor productivity (production per unit of labor) will be identical in this period with the rate of growth of the real gross national

Table 21. – Rate of investment and productivity of investment 1951 to 1960 and projections to 1965 and 1975, Austria

Period	Rate of investment 1/ 100s	Productivity of investment 2/ k	Marginal central coefficient 1/k	Rate of investment times marginal capital coefficient 100 sk	Rate of growth of GNP 3/ 100 w**
1951-1955	20.58	0.306	3.27	6.29	5.88
1955-1960	22.31	0.227	4.41	5.06	5.03
1960-1965	22.30	4/ 0.174	5.69	3.92	3.92
1965-1975	22.30	4/ 0.168	5.97	3.74	3.74

1/ $s = J_t / Y_t$ where J_t = fixed capital investment and Y_t = GNP.

2/ $k = \left(\frac{J_{t-1} + J_t}{2}\right) \Big/ \left[\frac{1}{d\,Y_t}\right]$

3/ $w^{**} = \frac{\log Y_t - \log Y_o}{t}$ (continuous compounding)

4/ derived from $w^{**} = sk$

product (table 21). In the period of 1965 to 1975 the rate of growth of the GNP will drop slightly to 3.81 percent, because of a decrease in the working population (a decline of 0.18 percent per annum). Based on assumptions concerning the development of labor productivity and of the labor force (as explained above in section 2), the gross national product in real terms (1951 prices) will rise in the next 5 years from 108,000 million schillings in 1960 or 21.7 percent to 131,400 million by 1975, another 45.4 percent, at the rate of 3.81 percent per annum to 191,000 million. The total increase in 15 years (1960 to 1975) will be 76.8 percent. These estimated values, as mentioned before will be valid under conditions of full employment. Should the years 1965 or 1975 fall into a recession period these estimates will not be fully attained. In 1958 the gross national product was 1.2 percent below the level that would have been obtained if there had been a uniform growth between the peak years 1955 and 1960.

The predicted values for the size of the gross national product in 1965 and 1975 imply a continuous decline in the productivity of investment. Taking the investment rate of 1955/60 (22.3 percent) as a basis and assuming that the GNP will grow at a rate of 4 percent per annum from 1960 to 1965, and at the annual rate of 3.81 percent from 1965 to 1975, the corresponding figures for the productivity of investment would be 0.176 and 0.168 respectively, as compared to 0.227 for the period from 1955 to 1960 and 0.306 for the period from 1951 to 1955 (table 22). Thus a given increment in national product will in the future require a larger investment than up to now. This decline in the productivity of investment is to be expected for several reasons. As has been mentioned before,

Table 22. – Growth in gross national product, in employment, and in labor productivity, 1951-1960 and projections to 1965 and 1975, Austria

Period	GNP in 1951		Employment		Productivity of labor	
	Total increase during the period	Annual increase, percent 1/	Total increase during the period, percent	Annual increase, percent 1/	Total increase during the period	Annual increase. percent 1/
	$100\left[\frac{Y_t - Y_o}{Y_o}\right]$	100w	$100\left[\frac{L_t - L_o}{L_o}\right]$	100L	$100\left[\frac{P_t - P_o}{P_o}\right]$	100p
	Million AS	Percent	Percent	Percent	Labor-units	Percent
1951-1955	+26,506	+6.05	-0.261	-0.07	+26,837	+6.11
1955-1960	+28,571	+5.16	+3.932	+0.77	+23,707	+4.35
1960-1965	+21,657	+4.00	+0.000	+0.00	+21,657	+4.00
1965-1975	+45,351	+3.81	-1.794	-0.18	+48,006	+4.00

1/ Under the assumption of compounding once a year, e.g.,

$Y_t = Y_o (1+w)^t$ $\qquad$ Y_t = GNP in t-th year

$L_t = L_o (1+L)^t$ $\qquad$ L_t = Labor force in t-th year

$P_t = P_o (1+p)^t$ $\qquad$ P_t = productivity of labor in t-th year

economic growth has been favored in the past (mainly from 1951 to 1955, and to a smaller extent from 1955 to 1960) by the special effects of postwar reconstruction and the "catching up" process. In addition, the period from 1955 to 1960 was marked by increasing employment. Future economic growth will depend on increased capital input and technical progress in the widest meaning of the word, including improved vocational training. Even under the condition of a constant labor input and a constant rate of technical progress, the productivity of capital is most likely to fall if the rate of investment remained at the same high level. In economic theory it is often argued that while marginal returns decrease with a growing stock of capital, this effect is fully offset by technical progress so that the capital-output-ratio remains fairly stable in the long run. This conclusion, which is based on empirical investigations is presumably only valid for medium investment rates. Finally, the productivity of investment in Austria in the last decade by far exceeded that in the United States and in most West European countries, with the exception of the Federal Republic of Germany, and Italy. The assumed productivity of gross investment for the periods from 1960 to 1965 and from 1965 to 1975 roughly corresponds to the average prevailing in the western European countries during the Fifties.

Table 23. – Projection of gross national product and national income until 1975, Austria

Year	GNP			National income			Per capita national income	
	Billion schillings (at 1951 prices)	1960 = 100	Annual increase in percent	Billion schillings (at 1951 prices)	1960 = 100	Annual increase in percent	1960 = 100 (at 1951 prices)	Annual increase in percent
1960	108.00	100.00		88.60	100.00		100.00	
1965	131.39	121.66	+4.00	106.52	120.23	+3.75	117.32	+3.35
1975	190.98	176.83	1/+3.81	154.12	173.95	1/+3.76	164.32	1/+3.43

1/ Annual growth rate 1965-1975.

The national income is expected to increase at a slower rate than the gross national product since the share of depreciation increases as the rate of growth declines. A rough computation yields an estimated ratio of national income to gross national product of 81.1 percent by 1965 and 80.7 percent by 1975 (1960, 82.0 percent). Under this assumption real national income (in 1951 prices) will amount to 106.5 billion schillings by 1965, and to 154.1 billion schillings by 1975 (table 23). The annual rate of growth will be in both periods about the same (3.75 percent and 3.76 percent). Taking into account the increase in population, per capita national income will rise annually by 3.35 percent from 1960 to 1965 and by 3.43 percent from 1965 to 1975. These estimates form the basis of the forecast of future food consumption.

The estimated rates of growth of per capita income on which the present forecast is based lie about halfway between the optimistic and the pessimistic forecasts of economic growth in Western Europe worked out in other countries and by international organizations. An ECE/FAO study 13/ for instance assumes that national per capita income in 20 Western European countries will increase from 1958 to 1965 by at least 2.4 percent and at most by 3.5 percent per annum (average 2.9 percent). For the countries of the Common Market which may best be compared to Austria with respect to economic structure and past growth, the estimated values range from 2.7 percent to 3.8 percent (average 3.3 percent).

13/ Economic Commission for Europe, Committee on Agricultural Problems in Cooperation with Food and Agriculture Organization (FAO) Agri/167. European Agriculture in 1965, Annex I, p. 47, August 23, 1960.

III. AUSTRIAN AGRICULTURE AND EUROPEAN ECONOMIC INTEGRATION

The present chapter treats the forces at work within Austrian agriculture in a broad and general manner. In particular, the discussion centers around (i) the probable trends in the labor force in agriculture and forestry, (ii) developments underway in the direction of mechanization of agriculture, (iii) the Austrian agricultural policy, (iv) foreign trade pattern for agricultural products, and (v) the probable effect of European integration on Austrian agriculture.

1. The Labor Input in Agriculture and Forestry

An ascertainment of the labor input in agriculture and forestry (which is difficult in itself) can draw only on scanty statistical material in Austria. The number of self-employed people (i. e. , owners) and family workers had only been ascertained in the agricultural censuses (1930, 1939, and 1951), and in the population censuses (1934 and 1951) which were conducted at considerable time-intervals, and in a special census in 1947. The number of hired workers is regularly reported in the social security statistics. However, it amounts only to a small percentage of the total number of farm workers, i. e. , 17 percent and 13 percent in 1930 and 1951 respectively. The number of hired workers, therefore, does not permit a conclusion as to the total potential labor input.

1.1 The Results of the Agricultural and Population Censuses

The agricultural census of June 1, 1951 included all persons employed on farms at that date. Out of the total number of 1.62 millions, 0.43 million persons were self-employed, 0.85 million persons were family workers, and 0.34 million persons were hired workers (table 24). The census also includes workers who belong to other occupational categories and are only occasionally engaged in farm labor, e. g. , small businessmen in rural areas as well as employees of the railroad and postal service.

The population census of June 1, 1951 indicates a total number of 1.08 million people who were primarily employed in agriculture and forestry. Out of this total, 0.31 million persons were self-employed, 0.54 million persons were family workers, and 0.23 million persons were hired workers. This census classified farmers' wives as family workers, whereas housewives in other economic groups were classified as "housewives without a profession" if they were not gainfully employed outside the household.

The figures of the census, which are grouped according to principal income, do not allow for conversion of the number of employed workers to labor-units (i. e. full-time workers) since farmers' wives and other female family members are temporarily employed in the household and, therefore, not fully available for farm work. On the other hand, it has to be considered that the working hours for family workers in agriculture are frequently longer than those of workers in other trades. Furthermore, people with nonagricultural occupations, e. g. , small business men and factory workers, who own farm land or forest property, are occasionally also employed in agriculture or forestry, especially during periods of peak demand for farm labor.

Table 24. - Employment in agriculture and forestry, census dates, 1930-1951, Austria

Item	June 14, 1930	May 17, 1939	May 1947	June 1, 1951
Total number of employed	1,718,077	1,643,550	1,539,075	1,624,034
Operators	480,424	1/ 431,284	452,978	2/ 432,848
Family workers	780,808	830,439	696,198	848,872
Permanently employed	633,415	758,618	651,423	671,534
Occasionally employed	147,393	71,821	44,775	177,338
Hired workers	456,845	381,827	3/ 389,899	4/ 342,314
Permanently employed	281,261	283,319	209,439	181,517
Day-laborers	134,100	98,508	150,618	131,963
Seasonal workers	41,484		16,752	28,834

1/ Main occupation 287,544; part-time occupation 143,740.
2/ Main occupation 299,385; part-time occupation 133,463.
3/ Covered by social insurance: 271,000.
4/ Covered by social insurance: 216,900.

Sources: Osterreichisches Statistisches Zentralamt, agricultural censuses of 1930, 1939, 1951, and employment census of 1947.

Another reason why the data of the agricultural and population censuses alone are inadequate for conversion to labor-units is the structural change of agricultural employment due to mechanization. This change is still going on; the number permanently employed (family workers as well as hired workers) is decreasing while the number of occasional family workers and (hired) day laborers is increasing. This structural shift will probably be indicated at a later date by the social security statistics, when all workers including the self-employed and their family members will be covered by social security. Efforts are being made to introduce compulsory insurance for the agricultural population. At the present time, noninsured family labor is predominant since only about 90,000 farms out of a total number of 433,000 employ hired workers.

Because of the lack of alternative data, the Institute has tried to estimate the number of labor-units on the basis of information furnished by the Agricultural Accounting Company about labor-input on farms which keep records. 14/ This estimate will be checked

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14/ The reports of the Agricultural Accounting Company cover all production areas of Austria. The farms were selected according to size and type in the different production areas, on the basis of a representative selection of their file-cards. The average figures for the production areas and the provinces as well as for the federal area, are weighted averages on the basis of the area-proportion of the individual production areas resp.

and, if necessary, be revised as soon as the results of the agricultural census of June 1, 1960, become available (and if they turn out to be reliable). For the first time, this census covered all persons in agriculture employed permanently, temporarily, and part-time.

1.2 Estimate of Labor Units

The Agricultural Accounting Company has computed the number of labor-units per 10 hectares of agricultural area for the farm covered by the survey during the respective years. The number of employed workers per unit of area, expanded to the total area, gives the total number of labor-units. These estimates, however, have to be adjusted for two reasons. First, the degree of representation has changed concomitantly with the change in the number of farms covered. For this reason, the ascertained labor-input per unit of area shows rather marked annual fluctuations during the period from 1951-52 to 1955-56. Beginning from 1956-57, the Accounting Company has included a larger number of small and medium-sized farms in the evaluation and has improved the weighting methods. The labor-input per unit of area as computed from 1957 onward is, therefore, more representative than the computations for the period from 1951-52 to 1955-56 but its comparability with the previous figures is only limited. Second, the survey does not cover specialized farms, very small farms, and farms operated as a sideline (part-time farms), e. g. , exclusive vine-growing farms or small areas below 2 hectares. Since these types of farms are highly labor-intensive, the survey underestimates the actual labor-input.

In order to eliminate deficiencies resulting from the accounting survey as much as possible, the total number of labor units was determined for 1958. According to the accounting survey, 2.63 labor-units were employed per 10 hectares of adjusted agricultural area. This figure times the total area indicates that there are 812,900 employed. Under the assumption that the figures derived from the accounting survey understate the actual number of employed workers by 5 percent due to the exclusion of small farms, the total number of labor-units in agriculture and forestry for the year 1958 amounts to 855,100. Then the absolute annual changes for the period from 1951-52 to 1955-56 and from 1957 onwards were computed from the number of employed workers as shown by the accounting survey, and expanded to the total area. According to this computation, the number of labor-units decreased on the average by 24,300 annually from 1951-52 to 1955-56, by 15,500 from 1957 to 1958 (less shifting of farm population into industry due to slackening business conditions), and by 21,600 from 1958 to 1959. The decrease from 1956 to 1957 could not be derived from the accounting survey because of a change in coverage; it was estimated at 20,000. These numbers of absolute changes were finally used to calculate ahead (and back in time) the number of labor-units which had been set at 855,700 for 1958. The calculation also showed 1,012,700 labor-units for 1951, that is 62.4 percent of the total number of employed workers according to the agricultural census of June 1, 1951

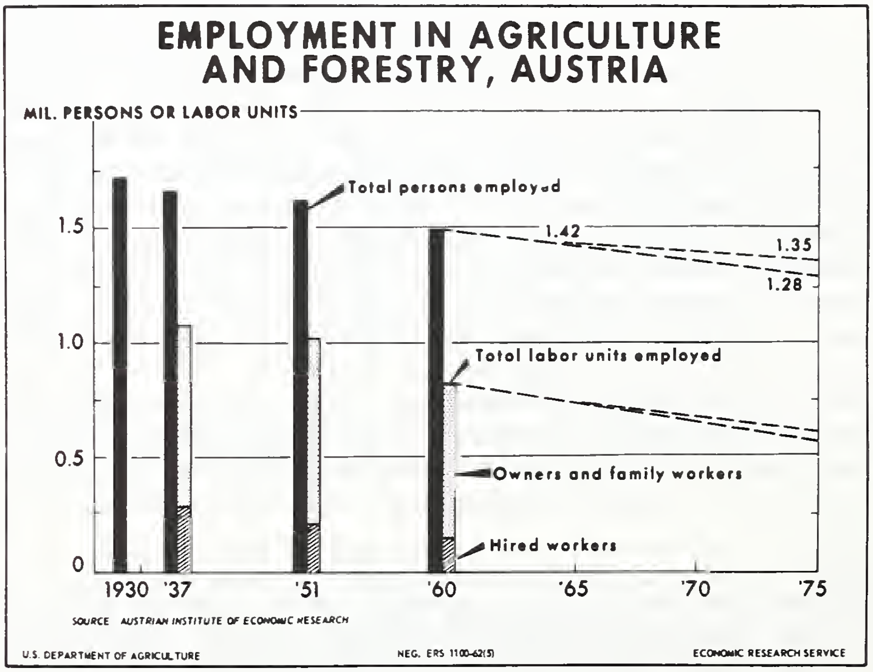
14/ (Cont'd) types of farms. In the production area "Alpenvorland". for example, row-crop, grain-crop, and grain-grassland farming are only represented in the average of the area through their area portions. See "Die Lage der osterreichischen Landwirtschaft 1955/56", report of the Agricultural Accounting Company, Vienna, 1957, p. 36.

(1,624,034). From 1951 to 1958 a total number of 157,000 or 15.5 percent of all labor-units had left the farms. The annual rate of this shift was 2.38 percent on the average.

An attempt was made to estimate the number of employed in 1937. According to the agricultural censuses of 1930 and 1939 (area of the Austrian Federal Republic), the number of persons employed in agriculture and forestry was 1.72 million and 1.64 million persons, respectively. Under the assumption that the rates of decrease of employment between 1930 and 1939 were uniform, the number of employed workers in 1937 was 1.66 million persons. Because the number of permanently employed prior to 1939 (including domestics) was relatively larger and the number of part-time workers (day-laborers, seasonal workers) smaller than after 1950, the total number of labor-units in 1937 can be estimated to be 1.08 million – that is, 65 percent (in 1951, 62.4 percent) of the total number of employed.

The number of workers and salaried employees in agriculture and forestry covered by health insurance was 285,600 in 1937 (annual average), 216,900 in 1951, and 141,400 in 1960. These figures include not only permanently employed persons but also seasonally and temporarily employed workers. They had to be converted into labor-units. Since there is no specific information regarding the degree of employment, the number of insured workers for the years 1956 to 1960 was reduced by 5 percent. For 1937 and from 1951 to 1955, the reduction had to be somewhat smaller (i. e., 3.7 percent), since at that time all employees in agriculture and forestry were not yet insured by the Agricultural Health-Insurance Company.

The difference between the total amount of labor-units and hired labor-units represents the number of owners and family-workers. From 1937 to 1958 the number of labor-units in agriculture decreased by 21 percent, the number of hired workers decreased by 43 percent, and the number of owners and family workers by 13 percent (fig. 1 and table 25).



SOURCE AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1100-62(5) ECONOMIC RESEARCH SERVICE

Figure 1

Table 25. – Labor-units in agriculture and forestry, 1937-1960, Austria [1]

Year	Total number of labor-units		Owners and family workers		Hired workers		Number of hired workers in percent of total employed
	1,000 units	Index (1937=100): Percent	1,000 units	Index (1937=100) Percent	1,000 units	Index (1937=100) Percent	
1937	1,079.1	100.0	804.1	100.0	275.0	100.0	25.5
1951	1,012.7	93.8	803.8	100.0	208.9	76.0	20.6
1952	988.4	91.6	786.8	97.8	201.6	73.3	20.4
1953	964.1	89.3	763.2	94.9	200.9	73.1	20.8
1954	939.8	87.1	745.3	92.7	194.5	70.7	20.7
1955	915.5	84.8	730.8	90.9	184.7	67.2	20.2
1956	891.2	82.6	716.8	89.1	174.4	63.4	19.6
1957	871.2	80.7	704.3	87.6	166.9	60.7	19.2
1958	855.7	79.3	700.1	87.1	155.6	56.6	18.2
1959	834.1	77.3	687.4	85.5	146.7	53.3	17.6
1960	803.3	74.9	[2] 674.0	83.8	134.3	48.8	16.6

[1] Calculations of the Institute on the basis of the agricultural censuses of 1930, 1939, 1951, on the results of the accounting survey of the Agricultural Accounting Company, and on the information given by the General Association of Social Insurance Institutions.

[2] Estimate on the basis of the expected future rate of decrease of 1.95 percent annually.

The percentage of hired workers in the total number of employed decreased from 25 percent in 1937 to 18 percent in 1958. The decrease of hired workers in the period from 1951 to 1958 amounted to 7,600 (annual average) or 4.12 percent, the decrease of owners and family workers was 14,800 or 1.95 percent.

1. 3 Projected employment until 1975

If employment continued to decline (in absolute terms) as sharply as it did in the past 8 years, the number of hired workers in agriculture would drop to half of the present level after 10 years, and to zero after 20 years. It would be unrealistic, however, to assume a development on this line. First it has to be considered that about 26,000 workers in forestry and saw mills are engaged in cutting, transportation, and production of sawn wood. This number will probably drop to 20,000 when more motor saws are used in the forests and the transportation of wood is more extensively mechanized. Second, there are 16,000 employees and 6,000 professionals as well as workers in cooperatives in agriculture and forestry. This number has a tendency to increase due to mechanization and continuous improvement in efficiency. Finally, farms with an agricultural area of more than 50 hectares and larger farm enterprises will employ approximately 20,000 to 25,000 farmhands in the future, even if they have to pay much higher wages than at the present time and improve social benefits. Since the mechanization of field and forest work, and the use of mechanical implements on the farmstead can release only a part of the labor force, an estimated supply of 60,000 to 70,000 well-paid skilled workers will remain indispensable.

The development in the United States and Great Britain also shows that fewer hired workers leave the farms when the degree of mechanization is more advanced, when wages are higher, or when the number of middle-sized and big farms has increased because of purchase and lease of additional land. In the agriculture of the United States (where farm-units are on the average much larger and more fully mechanized than on the European continent), the decrease of hired labor amounted to 2.73 percent annually between 1929 and 1935, but only 1.28 percent between 1951 and 1958. In Great Britain where conditions are similar to those in the United States, the number of hired workers has dropped 2.60 percent annually between 1950 and 1957.

The estimate of the present report assumes that the total number of hired workers, as well as that of owners and family workers, (in labor-units) in Austria will decrease until 1965 at the same annual rate as it did between 1951 and 1958, i. e., by 4.12 percent and 1.95 percent, respectively. In 1965, 116,000 hired workers and 610,000 family workers would remain for a total number of 726,000 labor-units in agriculture and forestry. As compared with the figures for 1937, the number of labor-units would drop to two-thirds, the number of owners and family workers to three-fourths, and that of hired workers to slightly more than two-fifths. Hired workers would amount to only 16 percent of the total employed.

For the period from 1965 to 1975, two alternative projections were calculated. Projection A is based on the same annual rates of change as valid for 1951-58; Projection B is based on lower rates, i. e., 3.5 percent for hired workers, 1.5 percent for owners and family workers (table 26). According to Projection A, a total of 577,500 labor-units was arrived at for 1975. According to Projection B, the number of labor-units should be 605, 000 (524,000 owners and family workers, 81,000 hired workers).

There are no planned efforts in Austria for an increase in the size of farm-units. This would necessitate that many small farms be abandoned and workers lose employment. It is more likely that efforts will be made to slow down the shifting of labor out of agriculture by farm policy and social measures. Moreover, the actual degree of migration of family workers is dependent on general business conditions, especially in those sectors of the economy which traditionally have absorbed agricultural labor (e. g. the textile industry, the construction industry, and the tourist trade). As a basis for well-founded estimates, sample surveys of family and wage labor would be necessary, and these would need to be stratified according to the duration of employment in farm-units of different size. Such samples are being taken by the Federal Statistical Bureau of the German Federal Republic. They form an important basis for reports on the situation of agriculture in accordance with Section 4 of the Agriculture Act (known as the Green Plan), and for measures of the German Federal Government to aid agriculture in accordance with Section 5 of the Act.

In the German Federal Republic, the number of agricultural labor-units has decreased from 3.32 million in 1953-54 to 2.60 million in 1958-59 (i. e. ,4.77 percent annually) according to the Green Report and an estimate of the Institute for Agricultural Market Research in Völkenrode. The estimate produced in the present report for Austria for the period from 1954 to 1959 indicates an annual decrease of only 2.36 percent. Accordingly, the estimate for Austria can be regarded as conservative. The marked decrease in the German Federal Republic is partly due to the fact that many refugees from the East were placed in the agricultural labor force as a temporary measure, irrespective of their previous occupation. Then they gradually shifted to other sectors of the economy. It is also likely that the number of small farm-units has decreased to a greater extent in Germany than in Austria since 1950. However, only the results of the 1960 agricultural census will substantiate this point. According to the "Grüner Bericht 1960," the number of farm-units below 10 hectares in the German Federal Republic has decreased by 219,300 or 14 percent from 1949 to 1959. The number of farm-units between 10 and 100 hectares, on the other hand, has increased by 30,100 or 8 percent.

During the past years, many owners of small farms have leased farmland to middle-sized and larger farms. Together with a part of their family, the owners have shifted to occupations in industry and trade. The so-called "tendency toward seeking one's main occupation outside agriculture" is supposed to continue as long as earning conditions elsewhere are favorable. Accordingly, a portion of the small farms have become part-time farms. The owners and family members are in these cases engaged in farm work only during peak periods of farm-labor demand (during the vacation period, on days off, sometimes before and after the regular working hours). Seasonal occasional labor in agriculture will, therefore, continue to increase. The mechanization of agricultural labor is partly reinforcing this trend.

The number of agricultural workers as ascertained by the agricultural census will decrease less sharply in the future than the number of labor-units. The ratio of total number of employed to labor-units, which was 100:65 in 1937 and 100:62 in 1951, will probably drop to 100:51 in 1965 and to 100:45 in 1975. In the German Federal Republic, the ratio of total employed to labor-units was 100:53 in 1953-54, 100:47 in 1957-58, and 100:46 in 1958-59.

According to the projection there will be a total number of 1.42 million persons employed in agriculture in 1965, that is, 204,000 (12 percent) less than in 1951 (fig. 1). From the alternative projections for 1975, the total number employed in agriculture will drop to 1.28 million persons (Projection A), or to 1.35 million persons (Projection B). Vis-a-vis 1951, the 1975 projection is 344,000 (or 21 percent) less than Projection A but only 274,000 (or 17 percent) less than Projection B.

2. Mechanization of Agriculture

2.1 Nature and Extent of Mechanization

Prior to World War II, mechanization was limited to a few large estates. According to the farm censuses of 1930 and 1939, the number of tractors on farms was 720 and 1,074 respectively. In 1946, when the first postwar agricultural machinery census was taken, there were already 7,344 tractors despite heavy losses through war actions and seizures. This amounted to seven times the prewar stock. In the following years the stock of tractors increased first slowly and then more and more rapidly, as the general economic situation improved and domestic production got started. According to the Central Statistical Office (Statistisches Zentralamt), the number of tractors in agriculture and forestry rose from 8,600 in 1948 to 118,800 in 1960, or by 14 times its 1948 level. Out of 100 farms, 36 had a tractor in 1960, as compared to 15 in 1955 and 6 in 1951. The tractor density per 1,000 hectares arable land and permanent grassland (except alpine pastures and meadows) amounted to 39 in 1960 whereas it had only been 17 in 1955 and 6 in 1951. [15]

Various factors accounted for the rapid mechanization of agriculture (a). The increasing scarcity of labor induced the displacement of manpower by machinery. (b) The use of machinery became cheaper as compared to human labor and the profitability of machine work rose accordingly. (c) The negligible indebtedness of agriculture, secured demand for cash crops, and continuous economic prosperity were favorable conditions for investment. Once the wave of mechanization had started, tractors were also bought for other than economic reasons. With the development of a domestic tractor industry they became almost self-sufficient in home production of agricultural products. This was fortunate since the shortage of foreign exchange reserves did not permit large imports.

The pace of mechanization reached its peak in 1956 (fig. 2).
Each preceding year showed a gain over the past one; the average annual rate of increase from 1948 to 1956 was 29 percent. Since 1956 the growth of mechanization has slowed down.

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[15] The computations of this section were based on an area of permanent grassland of 1,377,000 hectares. This is the figure estimated by the Central Statistical Office which probably overstates the actual size of the grassland area by 130,000 hectares (See Chapter VI). Computations on a modified basis yield a tractor density per 1,000 hectares arable land and permanent grassland of 41 in 1960.

Table 26. – Projected employment in agriculture and forestry until 1975, Austria 1/

Year	Total labor units		Owners and family workers		Hired workers		Number of hired workers in percent of total employed
	Number (1,000 units)	Index (1937=100)	Number (1,000 units)	Index (1937=100)	Number (1,000 units)	Index (1937=100)	Percent
1958	855.7	79.3	700.1	87.1	155.6	56.6	18.2
1965	725.7	67.3	609.8	75.8	115.9	42.1	16.0
1975 A	577.5	53.4	501.3	62.3	76.1	27.7	13.2
1975 B	605.5	56.1	524.4	65.2	81.1	29.5	13.4

1/ Projections of the Institute. According to Projection A, the calculations for 1965 and 1975 are based on the same annual rates of decrease as valid for the period from 1951 to 1958, i. e., 4.12 percent for hired workers, 1.95 percent for owners and family workers. For the calculations of Projection B, lower rates of decrease had been assumed, i. e., 3.5 percent for hired workers, 1.5 percent for owners and family workers.

Table 27. – Number of tractors in agriculture and forestry 1930-1960, by Federal Provinces, Austria

Year	Lower Austria and Vienna	Burgenland	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg	Austria total area
1930	-	-	-	-	-	-	-	-	720
1939	-	-	-	-	-	-	-	-	1,074
1946	-	-	-	-	-	-	-	-	7,344
1948	3,581	266	2,111	532	836	525	486	309	8,646
1949	4,662	347	2,813	608	1,065	711	652	395	11,253
1950	6,643	442	3,607	760	1,350	929	850	498	14,079
1951	7,006	556	4,932	1,131	1,669	1,131	1,088	586	18,099
1952	9,192	773	7,122	1,524	2,268	1,482	1,353	668	24,382
1953	11,945	1,262	9,246	1,812	2,786	1,805	1,584	797	31,237
1954	15,078	1,779	11,441	1,983	3,353	2,125	1,805	932	38,496
1955	20,155	2,365	15,046	2,410	4,456	2,779	2,203	1,112	50,526
1956	26,789	3,513	19,125	2,915	6,269	3,685	2,769	1,341	66,406
1957	32,152	4,440	23,005	3,364	8,022	4,336	3,445	1,534	80,298
1958	37,311	5,686	26,333	3,822	9,789	4,956	4,075	1,705	93,677
1959	41,790	6,691	29,479	4,316	11,579	5,588	4,740	1,856	106,039
1960	-	-	-	-	-	-	-	-	118,800

Source: 1930 and 1939: Agricultural census; 1946: Agricultural machinery census; 1948-1959: Calculations of the Institute, based on the annual census of motor vehicles in Austria, Central Statistical Offices (census date: Oct. 31). The census figures indicates only the total stock of tractors by Provinces; since the proportion in other economic sectors is small (it decreased from 26.1 percent in 1948 fairly uniformly to 5.8 percent in 1959), the tractors in agriculture and forestry were distributed in line with the distribution of the stock tractors owned by employees listed under agriculture and forestry (salaried employees and workers who own agricultural land).

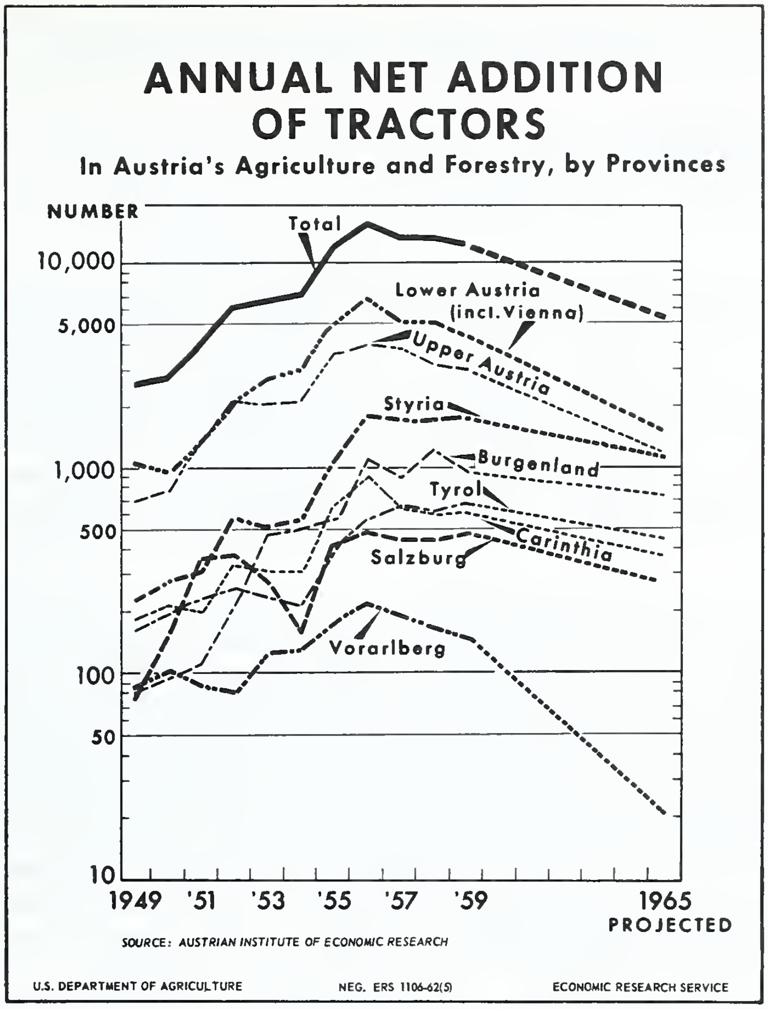

Figure 2

In 1959 new additions to the stock of tractors amounted to only 12,400 units (13 percent), as compared to 15,900 units (31 percent) in 1956. From 1956 to 1959 the annual rate of increase was 17 percent. Also in the boom year 1960 the number of tractors in agriculture increased by only 12,800 or 12 percent (preliminary figures), while investment in total agricultural machinery was 21 percent higher than in 1959 (in real terms). Farmers have shifted investment from tractors to other machinery which, in most cases, is a precondition for the efficient use of tractors.

The trend towards mechanization was primarily effective on larger farms. As shown by the agricultural machinery census of 1951, there was a close connection between farm size and tractor density (table 28). In this year the percentage of farms using tractors was 45 percent for those over 20 hectares; it was 33 percent in the category from 5 to 10 hectares. On the other hand, only 3 percent of farms below 5 hectares had a tractor. The tractor density is somewhat higher if it is computed for farms with agricultural land only, especially in the larger size categories which include many farms with large forest areas or alpine pastures.

In many instances farms that had a tractor still continue to use animal draft power. This is mainly true for larger farms where the cost of keeping draft animals is of minor significance. For smaller farms, however, the acquisition of a tractor means a heavy financial burden and they have to completely switch over to mechanical power. According to the machinery census of 1957, only 29 percent of the farms with tractors were fully mechanized. This percentage decreased with increasing farm size from 65 percent in small farms (2-5 hectares) to 15 percent in farms over 100 hectares.

The tractor density differs widely between Federal Provinces and between production areas (table 29). In Upper Austria and Lower Austria (provinces with the highest degree of farm mechanization) 49 percent and 42 percent, respectively, of all farms used a tractor in 1959. In Styria and Vorarlberg the percentage of motorized farms was only 18 percent, in Tyrol it was 20 percent, in Carinthia 21 percent, and in Burgenland 22 percent. Regional differences of similar proportions become also apparent if the number of tractors is related to the intensively cultivated agricultural area. In Upper and Lower Austria the number of tractors per 1,000 hectares arable land and permanent grassland amounted to 46 and 41 respectively; in Styria and Carinthia, only 23 and 22.

The considerable regional differences in tractor density can partly be explained by different topographical and climatic conditions in the various Federal Provinces. In the alpine Provinces (particularly in Tyrol, Vorarlberg, and in parts of Salzburg and Styria) the utilization of tractors is limited because of the mountainous terrain. The demand for draft power in these regions is also relatively low because the agricultural area consists mainly of permanent grassland and pastures. The proportion of arable land in the intensively cultivated agricultural area varies from 3 percent in Vorarlberg to 14 percent in Lower Austria and in Burgenland. In Burgenland, where topographical conditions and soil quality would permit the intensive utilization of tractors, the number of small-sized farms is an obstacle to mechanization. Also differences in the production conditions and in the attitude of farmers towards modern methods of farming are decisive.

In order to obtain a rough measure as to what extent the tractor has already displaced animal draft power, the degree of tractor use (mechanical draft power as a percentage of total draft power) was estimated in Austrian agriculture. For this purpose tractor units had to be converted into draft animal units. The conversion factor was obtained through a regression of the stock of draft animals (X_1) on the number of tractors (X_2) during 1952-59 (least square method), according to the formula

$$X_1 = a + K X_2$$

The regression coefficients (displacement ratios) k show how many draft animal units were displaced by one tractor in the period covered. The square of the correlation coefficient is in all cases close to unity so that the level of significance is satisfactory.

The results of the estimates are presented in table 29, broken down by provinces. According to this computation, one tractor displaced 1.7 draft animal units during the period from 1952 to 1959. The displacement ratios derived from time series analysis are lower than the ratios derived from the comparison of technical performance of tractors and draft animal units (expressed in HP). The difference is partly explained by the fact that together with more intensive cultivation and the increased utilization of machinery

Table 28. – Number of farms with tractors, number of tractors and density of tractors, by farm size, 1951, Austria 1/

Size category	Number of farms		Number of tractors	Percentage of farms with tractors	
	Total 2/	with tractors		Total	With arable land
Under 2 hectares	105,213	753	749	0.7	0.9
2 - 5 "	102,687	4,872	4,869	4.7	5.1
5 - 10 "	81,547	10,895	10,883	13.4	13.9
10 - 20 "	76,874	25,746	26,153	33.5	34.5
20 - 50 "	52,166	24,604	27,833	47.2	48.9
50 -100 "	8,083	3,191	4,314	39.5	45.0
Over 100 "	6,278	1,971	3,622	31.4	50.2
Total	432,848	72,032	78,423	16.6	18.3
Other owners			325		
Total number of tractors in agriculture			78,748		

1/ Agricultural machinery census of June 3, 1957.

2/ Farm census of June 1, 1951.

Table 29. – Indicators of regional tractor density, by provinces, 1951, 1955 and 1959 Austria

Province	Number of tractors per 100 farms over 2 hectares			Number of tractors per – 1,000 hectares arable land			Number of tractors per – 1,000 hectares arable land and permanent grassland 1/		
	1951	1955	1959	1951	1955	1959	1951	1955	1959
Lower Austria and Vienna	7	20	42	9	27	55	7	19	41
Burgenland	2	8	22	4	15	42	3	11	31
Upper Austria	8	25	49	16	47	94	8	23	46
Salzburg	9	19	34	22	45	83	7	16	28
Styria	3	7	18	8	20	54	3	9	23
Carinthia	4	10	21	11	26	54	4	11	22
Tyrol	5	9	20	24	47	105	6	13	30
Vorarlberg	6	11	18	188	381	991	9	18	31
Austria	6	15	32	11	30	64	6	17	35

1/ Grassland: permanent meadows, natural pastures, and "rough grazings" (excluding alpine pastures).

the demand for draft power has also increased. In addition, tractors are also used to run machines which hitherto required particular sources of energy, i. e. , threshing machines, pumps, forage cutters, and circular saws. Finally, it has to be considered that many farms could not fully utilize their tractors because of the lack of mounted implements and, therefore, had to keep their draft animals, at least for some time. For the purposes of this report (i. e. , working out regional differences in the degree of tractor use, estimates of future tractor use, and of displaced draft animal power) the displacement ratio derived from time series analysis is preferable since it includes also economic and institutional influences, apart from the purely technical aspects. The displacement ratio varied between 0.86 in Vorarlberg and 2.26 in Carinthia. In relatively undeveloped areas with low agricultural income (Styria and Carinthia) the displacement ratio was most favorable. In the pronounced alpine areas (Salzburg, Tyro, and Vorarlberg), on the other hand, a tractor displaced a lower amount of draft animal units, since mechanization is possible only in the valleys whereas the work on the slopes requires a relatively big number of draft animals. Also in Burgenland the displacement ratio was very low because of the large proportion of small farms (one-third of all farms is smaller than 2 hectares, almost two-thirds are smaller than 5 hectares).

The stock of draft animals and the number of tractors times the displacement ratio yields the total disposable draft power. The proportion of tractors in the total amount of draft power rose from 21 percent in 1955 to 34 percent in 1957 and to 50 percent in 1960. The degree of tractor use varied between 33 percent (Burgenland) and 52 percent (Lower Austria and Upper Austria). The regional classification according to the degree of tractor use corresponds fairly well to the regional classification according to tractor density per area-unit of arable land and permanent grassland. However, the differences between the various provinces are much less pronounced.

2. 2 Projected Number of Tractors until 1975

The possibilities of economic utilization of tractors do not seem to be nearly exhausted, even if allowance is made for the large proportion of mountain areas and the unfavorable distribution of farm sizes. The degree of tractor use and the tractor density differ widely among different areas and farm sizes; most of the farms which use tractors still keep draft animals. Even in Lower and Upper Austria, the provinces with the highest tractor density, the degree of motorization of 50 percent is rather modest. The further increase of motorization, however, will not be as fast as it has been. Already from 1956 to 1959 the stock of tractors in the two largest and most intensely mechanized provinces increased at a lower rate than in the preceding years.

In the future those farms will be primarily mechanized which do not yet have a tractor. In many instances, these are marginal farms, considering their location, size, and pattern of crop production, and only organizational changes will permit an economical use of a tractor. Also, many farms which have used tractors and draft animals in combination until now, are likely to buy a second tractor. This change will be promoted by the leading example of progressive farms, by the increasing scarcity and rising costs of labor, and by the prestige enjoyed by a fully mechanized farm and its attractiveness to the younger generation. Since the agricultural area cannot be extended and the scope of intensified cultivation is limited (in the alpine areas permanent grassland is continuously increasing at the cost of arable land), the tractor density as well as the degree of motorization will both increase.

The annual additions to the stock of tractors decreased on the average by 8 percent from 1956 to 1959. The year 1959 was selected as the base year of the projection since regional data on the stock of tractors in 1960 are not yet available. Furthermore, the increase in 1960 was unusually high due to the booming business conditions and a record harvest and is, therefore, not typical. The rate of decrease in the individual years varied between 3.7 percent in 1958 and 12.5 percent in 1957. Because of the gradual satiation of demand a lower rate of increase than the average rate of the past years is likely in the future. Under the assumption that additions to the stock will slow down by 12 percent annually, the future number of tractors can be estimated according to the formula:

$$T_n = T_o + Z_o q. \left(\frac{1 - q^n}{1 - q}\right); \; q = 1 - \frac{P}{100}$$

T_o = number of tractors in the base year
T_n = number of tractors after n years
Z_o = additions to the stock in the base year
p = annual rate of decrease of additions in percent.

With 1959 as the base year, the calculation for 1965 yields a total number of 155,000 tractors, according to the equation:

$$T_{1965} = 106{,}039 + 12{,}362 \,.\; 0.88 \left(\frac{1 - 0.88^6}{1 - 0.88}\right)$$

Calculations for the various provinces are presented in table 31. The average growth rate of the stock of tractors in the period 1959-65 amounts to 6.5 percent. Growth rates in Lower Austria, Upper Austria, and Voralberg have slowed down during the past years. The aggregate estimate implies that the growth rate will also slow down in the rest of the provinces where mechanization is lower and tractors have increased at a fairly constant rate.

If the stock of tractors in the individual farm-size categories, according to the 1957 machinery census, is extrapolated the total number of tractors (155,000) is the same. The extrapolated results, shown in table 32, are based on several basic assumptions. Presumably the largest increase in tractor density will occur on middle-sized farms which, so far, have been comparatively less mechanized. It was assumed, therefore, that in 1965 about 30 percent of farms with 5 to 10 hectares and about 75 percent of farms with 10 to 20 hectares of agricultural area will use a tractor, as compared to 13 percent and 33 percent, respectively, in 1957. For the size category of 20 to 50 hectares, a tractor density of 80 percent (1957: 47 percent) was assumed; about one-fourth of these farms will probably use two tractors.

The addition to the stock in the size categories over 50 hectares has to be estimated rather cautiously. The small proportion of motorized farms in 1957 (36 percent) is due to special influences. Many of these farms own mainly alpine pastures and partly large forest land where transportation is carried out mostly by trucks. For the category of 50 to 100 hectares an increase of 4,000 tractors was estimated - 2,000 will be used on farms which did not yet have a tractor in 1957 and 2,000 will probably displace the stock of draft animals which are still used on many farms already mechanized. The tractor density in this size category will, therefore, increase from 39 percent in 1957 to 65 percent in 1965. For large farms over 100 hectares an increase of 900 tractors was assumed. This raises the tractor density from 31 percent to about 40 percent. The low tractor density is due to the particular type of these farms and can hardly be raised substantially. According to the 1951 farm census, 3,200 out of a total number of 6,300 farms over 100 hectares of forest land.

Table 30. - Structure of draft power 1959, by provinces, Austria

Province	Draft animal units 1/	Number of tractors	Displacement ratio 2/ (K)	Draft power units 3/	Mechanical draft power as percent of total draft power
Lower Austria and Vienna	70,201	41,790	1.83	146,677	52.1
Burgenland	18,233	6,691	1.37	27,400	33.5
Upper Austria	41,378	29,479	1.50	85,597	51.7
Salzburg	8,830	4,316	1.29	14,398	38.7
Styria	47,188	11,579	2.07	71,157	33.7
Carinthia	20,771	5,588	2.26	33,400	37.8
Tyrol	9,390	4,740	1.14	14,794	36.5
Vorarlberg	1,916	1,856	0.86	3,512	45.4
Austria	217,907	106,039	1.69	396,935	45.1

1/ One draft animal unit equals 1 horse or 1.4 draft oxen or 6 draft cows.

2/ Regression coefficient of draft animal stock on tractor stock (number of draft animal units replaced by 1 tractor).

3/ Draft power unit equals draft animal units plus (number of tractors times K).

On the other hand, a relatively large number of small farms are likely to buy a tractor since they increasingly turn to capital intensive specialized production. The increase in the period 1957/65 was estimated at 2,130 tractors (44 percent) on farms from 2 to 5 hectares, and at 350 tractors (47 percent) on farms under 2 hectares. The tractor density in these two size categories will amount to 7 percent and 1 percent in 1965.

Table 31. – Estimated stock of tractors in 1959 and projection for 1965, by Provinces, Austria

Province	Number of farms over 5 hectares 1/	Number of tractors	
		1959	1965
Lower Austria and Vienna	67,848	41,790	57,000
Burgenland	17,912	6,691	11,800
Upper Austria	41,808	29,479	41,000
Salzburg	10,492	4,316	6,500
Styria	44,012	11,579	20,000
Carinthia	20,655	5,588	8,500
Tyrol	15,980	4,740	8,000
Vorarlberg	6,241	1,856	2,200
Austria total area	224,948	106,039	155,000

1/ Agricultural census 1951.

By 1975 the stock of tractors may have reached its maximum level. The projected number of tractors in the 1975 target year is presented in table 33 under two different assumptions. Under the probably too optimistic assumption that new additions will continue to decrease by 12 percent annually (Projection A), there will be 185,000 tractors in 1975. 16/ The average growth rate will be 1.78 percent in the period 1965/75 and 3.54 percent in the period 1959-75.

It is, however, realistic to assume that the rate of growth will more and more slow down as the stock of tractors reaches its maximum level (point of satiation). Alternatively an average decrease of new additions of 20 percent annually was assumed for the period 1965-75 (Projection B). 17/ This means that the number of tractors in 1975 will amount to 175,000. Under this assumption the average growth rate is 3.18 percent for the period 1959-75 and 1.22 percent for the period 1965-75.

The 1951 farm census indicated 188,000 farms with an agricultural area of more than 5 hectares. Under the assumption that the number of farms in the size categories above

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16/ According to the equation: $T_{1975} = 106{,}039 + (12{,}362)\,(0.88)\left(\frac{1 - 0.88^{16}}{1 - 0.88}\right)$

17/ According to the equation: $T_{1975} = 155{,}000 + (5{,}740)\,(0.8)\left(\frac{1 - 0.8^{10}}{1 - 0.8}\right)$

5 hectares will not change significantly, the maximum stock of 175,000 tractors will be distributed among the various size categories in such a way that about 80 percent of the farms between 5 and 20 hectares will be motorized (108,000), 80 percent of the farms between 20 and 50 hectares will have at least one tractor and 40 percent will have two (about 30,000), and 80 percent of the farms above 50 hectares will use two tractors (12,000). About 25,000 tractors will be used by small farms with less than 5 hectares and by forest enterprises.

2. 3 Projected Stock of Draft Animals until 1975

Prior to World War II Austrian agriculture used 209,000 working horses, 180,000 draft oxen, and 277,000 draft cows. This is altogether 384,300 draft animal units. 18/ (table 34). By the end of 1955 total animal draft power had decreased by 17 percent, mainly because the number of draft oxen had been reduced by 47 percent. The number of horses was only 1 percent lower than in 1938 and that of draft cows 10 percent lower. By the end of 1960, when already more than 120,000 tractors were used in agriculture, the volume of animal draft power was 48 percent smaller than in 1938. The number of draft horses had decreased 33 percent and that of draft cows by 34 percent. The number of draft oxen had been reduced to less than one-fourth of its prewar level; 80 percent of the stock was kept in Lower Austria and Styria.

Most of the decrease in draft oxen occurred in the flat area and in areas with developed dairy farming. From 1948 to 1950 the number of draft oxen decreased 93 percent in Burgenland, 86 percent in Vorarlberg, and 82 percent in Upper Austria. The decrease in Carinthia and Lower Austria amounted to 75 percent and 73 percent, respectively. Even in the traditional breeding areas, draft oxen have greatly diminished in importance. In Styria and Tyrol the stock was reduced to 45 percent and 41 percent, in Salzburg to 28 percent of its 1948 level. In the prewar years, draft oxen breeding in these areas was generally more profitable than dairy farming since the regional discrimination of milk prices was unfavorable to farms located in higher altitudes or removed from traffic. The alpine farmers, therefore, often specialized in oxen breeding and supplied a considerable proportion of draft animals needed in other areas. Since the beginning of mechanization, however, the demand in the flat areas for draft oxen has decreased rapidly. At the same time the uniform producer's price for milk in the entire Federal area has diminished the unfavorable effect of transportation costs in removed areas and made intensive dairy farming possible. Also the rising domestic and foreign demand for cattle for slaughter and draft animals, as well as the demand of farms in the sugarbeet growing areas for young cattle for fattening were an incentive for the alpine farmers to change their production pattern and breed fewer draft oxen. Farms in the sugarbeet area are required by a special law to keep a certain number of cattle for fattening. The number varies according to the size of their operation.

The number of draft cows decreased 34 percent from 1938 to 1960. This decrease was relatively small because small farms cannot easily switch to another type of draft power, particularly in Styria and in Brugenland where in 1960 more than half of all draft cows

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18/ A draft animal unit is defined as one horse over 3 years, 1.4 draft oxen, or 6 draft cows.

were used. There were only 17 percent fewer draft cows in use in 1960 than in 1948 in Styria and 29 percent fewer in Burgenland. In the other Provinces the number of draft cows was reduced by 40 to 60 percent in favor of the more profitable production of milk and meat.

Table 32. – Number of tractors and percent of farms using tractors, by size of farm, 1957, and projection for 1965, Austria

Size of farm	Number of farms 1/	Number of tractors		Percent of farms using tractors	
		1957 2/	1965	1957	1965
Under 2 hectares	105,213	749	1,100	1	1
2 - 5 "	102,687	4,869	7,000	5	7
5 - 10 "	81,547	10,883	24,000	13	30
10 - 20 "	76,878	26,153	58,000	33	75
20 - 50 "	52,166	27,833	52,000	47	80
50 -100 "	8,083	4,314	8,000	39	65
Over 100 "	6,278	3,622	4,500	31	40
Total	432,848	78,423	154,600	17	33
Other owners		325	400		
Total number of tractors		78,748	155,000		

1/ Agricultural census 1951.
2/ Machinery census 1951.

The number of draft horses in 1960 was 33 percent smaller than in 1938. In Lower and Upper Austria, where mechanization has advanced more, the stock of draft horses has declined 49 and 35 percent respectively. In the other provinces, the decrease was only between 6 and 22 percent. In Styria the number of horses was only 1 percent lower in 1960 and even 3 percent higher in 1959 than before the war. The stock of draft horses was influenced by two countervailing factors. On the one hand, draft horses were displaced by tractors. On the other hand, draft cows and draft oxen were displaced by horses. In the beginning phase of mechanization the displacement of draft cows and draft oxen by horse draft power was predominant. In the immediate postwar years there were 15,000 more horses than in 1938, and still in 1953 the number was about equal to that in 1938. Only when tractors were used on a bigger scale and the stock of draft oxen had been greatly reduced, did the number of draft horses begin to decline. Since 1956 the annual decrease has amounted to some 15,000 horses.

Table 33. – Projection of the number and density of tractors to 1975, Austria

Year	Total number of tractors	Number of tractors per 1,000 hectares of--	
		Arable land	Arable land and permanent grassland 1/
1959	106,039	64	35
1960	118,800	72	39
1965	155,000	95	52
1975 A	185,000	116	62
1975 B	175,000	109	59

1/ Under the assumption that the area of arable land will be reduced from 1.65 million hectares in 1959 to 1.63 million hectares in 1965 and to 1.60 million hectares in 1975, whereas the area of permanent grassland will remain unchanged.

The future level of animal draft power can be derived from the relation between the stock of draft animals (X_1) and the number of tractors (X_2) which had been calculated for the period 1952-59. It is assumed that the displacement ratio derived from past years will also be valid in the immediate future. According to the equation

$$X_1 = 400,000 - 1.7 X_2$$

there will be 140,000 draft animal units in 1965 in addition to 155,000 tractors.

In the period from 1965 to 1975 many small farms with few draft animals are likely to be mechanized and bigger farms will buy additional tractors. Numerous farms, especially in mountainous areas, will use tractors because of the increasing labor shortage but will also have to keep a relatively high number of draft animals because of topographical conditions. Reduction of excess draft animal power pushed the displacement ratio up to 2.0 in the period 1956-59. A somewhat lower displacement ratio (K = -1.5) was projected for the period from 1965 to 1975. Calculations for 1975 (analogous to that for 1965) yield a stock of 95,000 to 110,000 draft units along with 185,000 (Projection A) and 175,000 (Projection B) tractors. The average of these projections yields a volume of draft power for 1975 of about 180,000 tractors and 100,000 draft-animal units.

Only a crude estimate can be made concerning the distribution of the decrease among the various types of animals. The substitution of draft oxen by horses and tractors is likely to continue because after several years of draft labor, oxen can be sold for slaughter only with difficulties, and at low prices, due to consumer resistance to the meat of old fattened oxen. A decrease of 20,000 by 1965 and a final stock of 5,000 to 10,000 in 1975 can be assumed. If the number of horses decreases absolutely at the same rate as the number of tractors increases (as occurred on the average in the last years), the stock of draft animals will be reduced to 105,000 in 1965. Under these assumptions the number of draft cows will fall to 125,000 or about 20,000 draft-animal units (difference between the estimated number of draft oxen and horses, and the total stock of draft animals). An estimate indicates that by 1975 Austrian agriculture will use about 85,000 working horses and about the same number of draft cows.

Table 34. – Draft animal stock and required feed-crop acreage, 1938-1960 and projections for 1965 and 1975, Austria

Year	Working horses 1/ (1,000 head)	Draft oxen (1,000 head)	Draft cows (1,000 head)	Draft animal units 2/ (1,000 units)	Required feed-crop acreage 3/ (1,000 hectares)
1938	209	180	277	384.3	500.7
1948	224	140	283	317.6	480.1
1949	217	138	287	362.8	469.3
1950	219	132	282	360.7	465.7
1951	219	128	286	358.1	462.3
1952	221	128	280	359.0	463.2
1953	220	114	268	346.3	445.3
1954	215	104	255	331.4	425.2
1955	207	96	250	317.4	406.9
1956	196	82	242	295.3	378.2
1957	181	68	230	267.5	342.2
1958	166	57	217	242.9	310.5
1959	152	48	191	217.9	277.9
1960	139	42	182	199.8	255.0
1965	105	20	125	140	180
1975 A	78	5	80	95	120
1975 B	90	7	90	110	140

1/ Horses over 3 years.
2/ One draft animal unit equals 1 horse, 1.4 draft oxen, or 6 draft cows.
3/ The required feed-crop acreage was assumed to be 1.2 hectares for one horse, 1.0 hectare for one ox, and 0.25 hectare for one cow.

If the required feed-crop acreage for one horse is set at 1.2 hectare, for one ox at 1.0 hectare, and for the draft work of one cow at 0.25 hectare, some 500,000 hectares were necessary to produce the feed demand for draft animals before the war. In 1960 about 255,000 hectares were sufficient, i.e., 49 percent less. Due to the continuing reduction of draft animals, another 15,000 hectares will be available for production of cash crops as well as forage and feedcrops for meat and milk production in 1965, and a further 40,000 to 60,000 hectares will be available in 1975.

On the basis of the estimated stock of tractors and draft animals, the degree of tractor use will reach 65 percent in 1965 and 75 percent in 1975 (table 35). The actual proportion of mechanical draft power will be somewhat higher, since many other machines are used besides tractors in agriculture, notably self-propelled combine harvesters, trucks, mowers, small tractors, and cable winches in the mountain areas.

2. 4 International Comparison of Tractor Density

With regard to tractor density Austria ranks about in the middle of West European countries with developed agriculture. In 1958 there were 50 tractors per 100 farms with an agricultural area of more than 5 hectares; this corresponds roughly to Denmark, the Netherlands, and Switzerland (table 36). The tractor density was considerably higher in Great Britain with more than 100, in the German Federal Republic 90, and in Sweden 79. In France and Belgium, on the other hand, there were only 38 and 36 tractors respectively per 100 farms and in Italy as few as 23. Similar results are obtained if the tractor density with respect to arable land as well as to arable land and permanent grassland is calculated.

Table 35. – Degree of mechanization and related data, 1959-60 and projections for 1965 and 1975, Austria

Year	Draft animal units	Number of tractors	Displacement ratio	Mechanical draft power as percent of total draft power
1959	217,907	106,039	1.7	45
1960	199,800	118,800	1.7	50
1965	140,000	155,000	1.7	65
1975 A	95,000	185,000	1.5	76
1975 B	110,000	175,000	1.5	73

Regional comparisons, however, are of only limited significance since the differences in operation and input of factors of production are partly due to geographical and climatic conditions. In order to make the data comparable special regional factors would have to be taken into account as well as the labor input per hectare, the size structure of farms, and the crop production pattern. The indicators presented on table 36 give at least a rough idea of the degree of motorization in the various countries and allow some conclusions concerning the future development in Austria.

From 1950 to 1958 the number of tractors in most countries increased by three and a half to five times (table 37). The increase was largest in the German Federal Republic and in Austria with 542 percent and 400 percent respectively. In Great Britain and in Sweden the growth was much smaller (34 percent and 123 percent), since stocks had been very high in 1950. The growth rates in percent were generally smaller in the period 1950-54, with the exception of France. In Great Britain the absolute additions in the second period decreased by almost 80 percent. The fast growth of tractors in Austria cannot be explained solely by the low tractor density in the base year, because in countries with a still lower degree of motorization the development was much less rapid.

Table 36. — Number of tractors in relation to hectares of land, by Western European countries, 1958

Country	Number of tractors per 100 farms over 5 hectares	Number of tractors per 1,000 hectares of arable land 1/	Number of tractors per 1,000 hectares of arable land and permanent grassland 2/
Belgium	36	37	22
German Federal Republic	90	80	48
Denmark	54	31	27
France	38	26	16
Great Britain	(100)	61	35
Italy	23	13	10
Netherlands	47	64	29
Norway	63	48	39
Sweden	76	39	33
Switzerland (1957)	38	83	31
Austria	50	54	30

Source: Calculations of the Institute based on data of the FAO in Production Yearbook 1959, and the OEEC in The Small Family Farm.

1/ Including gardens, land under crop trees, and vineyards.
2/ Excluding alpine grassland and "rough grazings."

A comparison of Austria with the German Federal Republic is specially illuminating since the proportion of farms with more than 5 hectares agricultural area is almost the same in both countries (43.8 percent as compared with 43.4 percent), and the ratio of arable land to the total area of arable land and permanent grassland differs only slightly (60 percent as compared to 56 percent). To achieve the tractor density of Western Germany in 1958 (calculated for arable land and permanent grassland) Austria would have to use some 152,000 tractors. The Federal Republic of Germany had already by mid-1956 as many tractors per area-unit as Austria in 1959. It can be assumed that due to the large proportion of farms in mountainous areas, Austrian agriculture will need about twice as long to raise the density from 35 to 49 tractors per 1,000 hectares arable land and permanent grassland. A stock of about 155,000 tractors in 1965 seems a realistic estimate.

3. The Present System of Agricultural Policy in Austria

The objectives of Austrian agricultural policy are (i) to secure producers an adequate level of income by means of market regulations, (ii) to assure consumers as far as possible of stable prices and sufficient supplies of food commodities; and (iii) to improve the situation of mountain farmers working under unfavorable production and living conditions. The measures directed towards relieving the position of alpine farms include the construction of farm roads, flood and avalanche control, electrification, improvement of the infrastructure (promotion of industrial settlements and of tourist trade), and various other social and economic aid programs.

Table 37. – Number of tractors in European countries, 1937 to 1958

Country	Average prewar (1937-39)	1950	1954	1958
		1,000 tractors		
Belgium	1	10	20	37
German Federal Republic	30	139	371	696
Denmark	3.5	18	51	86
France	36	139	250	559
Great Britain	50	325	417	436
Italy	36	57	125	207
Netherlands	4	18	36	67
Norway	3	11	25	40
Sweden	23	64	105	142
Switzerland	5	18	24	1/ 37
Austria	2	15	40	95

1/ 1957.

Source: FAO, Production Yearbook, 1953, 1956, 1959; OEEC, Agricultural and Food Statistics, 1956.

The legal basis of the measures envisaged is formed by the Market Regulation Act of December 14, 1958, BGBL. Nr. 276 (Bulletin of Federal Legislation) including three supplementary laws; and the General Agricultural Act of July 13, 1960, BGBL. Nr. 155. These bills are aimed at promoting agriculture by means of market regulations and structural policy measures. The General Agricultural Act does not provide, however, for the establishment of rigid price or income parities between agriculture and industry. According to the provisions of the bill, "Green Reports" and "Green Plans" are to be submitted to Parliament each year. These documents analyze the state of agriculture and contain the measures which the Federal Government regards as necessary for raising the productivity and strengthening the competitive position of agriculture.

The problem of whether the policies to be adopted should primarily concentrate on market regulations or on structural measures is also being discussed. The Agricultural Act states that both methods should be employed "hand in hand" because structural aid would prove unsuccessful unless market regulations secure adequate returns. So far, agricultural policy has relied mostly on market interventions. Now, the Agricultural Act provides also for the allocation of larger funds for the execution of structural measures. The extent to which such improvements can be realized will be determined in the future by the budgetary situation.

3. 1 Market Regulations and Price Policy

In this country agricultural markets are regulated through a rather complex system of government interventions and measures which are primarily based on quantitative import restrictions and apply to all important agricultural products. In general, import licenses are issued when consumer prices climb above a fixed level. The import prices of various commodities (e. g. , bread, grain, feed grain, slaughter animals) are adjusted to the domestic level by means of import equalization levies or by subsidies. In general, agricultural exports are also controlled. For some of these products, maximum and minimum prices "price corridors" have been established. When market prices reach the upper limit, additional imports are admitted and, if necessary, exports are stopped When prices approach the minimum level, part of the supply is taken out of the market. No regulations are applied to the domestic markets for feed grain, fruit, vegetables, wine, poultry, and eggs. In the case of live animals, a rather liberal policy is applied. For bread grain and milk, however, a strict control of prices and supplies has been installed. Among other measures, the respective agencies are authorized to determine the distribution of deliveries and to set production targets for the processing enterprises. In part, these functions are not executed by the government but by official bodies which have been established for this purpose, e. g. , the Grain Compensation Fund and the Milk Board.

The prices of bread grain, milk, feed grain, and fertilizers are government-controlled and subsidized from budgetary funds. The price subsidies can be traced back to the "Fifth Wage and Price Agreement" in 1951, and were established to secure for farmers an adequate level of income and, at the same time, to keep the cost of living of low-income groups as low as possible. The total amounts spent for the price support of bread grain, milk, feedstuffs, and fertilizers, reached AS 1.04 billion in 1952, AS 1.24 billion in 1956, and AS 1.62 billion in 1960 (table 38), which corresponds to 4.9 percent, 4.0 percent, and 3.6 percent, respectively, of total federal expenditure, and 10.8 percent, 10.3 percent, 12.5 percent, respectively, of the value added by agriculture and forestry.

The marketing of agricultural produce at reasonable prices was facilitated by the fact that the output of important commodities has not yet reached the level of domestic demand. The risks arising from overproduction could, therefore, be turned over to foreign suppliers by means of import restrictions. The domestic supply of some products (particularly of milk and sugar, and recently wheat) has already outstripped demand, and efforts are being made to cope with the problems associated with surplus production. In the case of milk, the surplus is processed for dairy products which are exported at reduced prices. For sugarbeets, delivery quotas have been set up and the quantities assigned to individual producers are taken by the industry at agreed prices. The overproduction of wheat is checked by offering special price inducements for the production of quality wheat.

Table 38. Federal price subsidies for important commodities, 1952, 1956, and 1960, Austria

Product	1952	1956	1960
	Million AS		
Bread grain	386	398	546
Milk	71	523	798
Feeds	443	200	50
Fertilizers	141	123	227
Total	1,041	1,244	1,621
As percentage of total federal expenditure	4.9	4.0	3.6

Grain. The wholesale and retail prices for bread, flour, baked goods, and other grain products are based on average prices of AS 195 per 100 kilograms for wheat and of AS 175 for rye, whereas producer prices had been fixed at AS 250 and 230, respectively. The price difference is paid to the farmers from budgetary means. The monthly prices for home-produced bread grain are determined on a sliding scale in such a way that their level is lowest in July and highest from February to June. This measure is aimed, on the one hand, at discouraging excessively large market deliveries at harvest time and, on the other, at raising funds for the purpose of covering by government grants part of the storage costs encountered by dealers and processing enterprises. For quality wheat, producers have so far received an additional payment varying according to grade (I, II, III) from AS 7 to 12 per 100 kilograms. This small premium, however, was hardly a stimulus to increase production and deliveries, since the yields from quality wheat are usually lower than those of normal varieties. In July, 1961, though, the base price for domestic quality wheat was raised from AS 250 to AS 254 per 100 kilograms, while at the same time, the price for soft wheat was reduced from AS 250 to AS 247. Since the supply of quality wheat accounts for only 10 to 20 percent of total wheat deliveries, the amounts saved by lowering the price for normal wheat can be transferred to a compensation fund from which further rewards amounting from 6 to 14 AS per 100 kilograms can be given to quality wheat producers, along with quality premiums paid farmers by the milling industry. This compensation arrangement is executed within agriculture, and neither the amount of government price support (which is on the average AS 55 per 100 kilograms) nor the price of quality wheat to be paid by the mills is affected by this measure. If the various premiums are included, producer prices per 100 kilograms of certified "high quality" wheat amount to AS 280 for grade I, AS 273 for grade II, and AS 267 for grade III as compared to AS 247 for ordinary wheat. This system of price determination is intended to stimulate the production of quality wheat and, at the same time, to reduce the area under soft wheat.

Furthermore, for socio-political reasons, the "Mill Compensation Arrangement" has been established. It provides for reduction of the price difference between rye bread on the one hand, and all foods manufactured of wheat flour (white bread, rolls, cooking flour, semolina, etc.) on the other. The milling enterprises pay a levy on the quantity of wheat milled which goes into a fund. From this fund enterprises are granted premiums on the quantity of rye processed. The purpose of this regulation is to supply low-income groups whose consumption of rye bread is well above average with low-priced bread and, at the same time, to keep the producer price for rye at a relatively high level. This, in the first place, favors farmers in regions where only rye can be grown owing to adverse climatic conditions and poor soils (e. g., the Mühlviertel in Upper Austria and the Waldviertel in Lower Austria).

Bread and coarse grains may be imported only on licenses issued by the Grain Compensation Fund. After the new harvest, this body prepares the annual import and export programs and determines also when to import, the quality of the imported products, and their distribution. If import prices are below the domestic level, a levy is raised on imports. If, on the other hand, imports are more expensive, they are subsidized from the federal budget. The import trade is carried out by private enterprises which deliver the grain to the mills according to the directives of the Fund. Since imports are admitted only to the extent of actual requirements, it has been possible so far to secure the sale of the domestic produce at reasonable prices.

The Transport Cost Compensation Arrangement calls for uniform grain costs to any mill in the entire federal territory and, subsequently, uniform consumer prices for bread and flour. This measure seemed necessary because grain is produced primarily in the eastern parts of the country and has to be shipped in large quantities to the consuming centers in the southern and western regions. Similarly, there has also been established a transport cost pooling system which provides for equal feed grain prices all over the country. The funds are derived from the levies placed on grain imports for the price equalization between foreign and domestic grain.

Quality wheat for improving flour quality is allocated to the mills in relation to the quantity of domestic grain they take over and store. This is to secure the complete sale of the domestic supply prior to the new harvest. Due to the increase of wheat production, the share of quality wheat in total supply, which had amounted to 30 percent until 1958, had to be reduced in 1960/61 first to 8 percent and later to 5 percent. Apart from normal soft wheat, Austria also produced in 1960 for the first time 40,000 tons of quality wheat, thanks to favorable weather conditions and the availability of well-suited varieties. Therefore, apart from foreign hard wheat, the mills had about 15 percent of domestic quality wheat at their disposal. A significant deterioration of flour quality or of the products thereof (as a consequence of the reduction of foreign hard wheat quotas) has been experienced.

The prices of domestically produced feed grains are not supported. Foreign feed grains, however, are sold to farmers at a fixed price (AS 205 per 100 kilograms). Until 1959, the import prices including freight costs and trade margins were above the domestic level and were reduced by means of federal grants. The present import prices are lower than the domestic quotations due to the receding world market prices; therefore, they are raised to the domestic level by imposing import levies. Since Austria imported about 400,000 tons of feed grain in 1959 and some 550,000 tons in 1960 (i. e. , 45 and 47 percent respectively, of total indigenous production), the price control for imported grains had a stabilizing effect on the entire feed market. In spite of fluctuating harvests, domestic feed grain prices fluctuated very little in the past and their relation to bread grain and livestock product prices remained nearly stable.

A comparison of grain prices paid farmers in Europe shows that Austria keeps a medium level (table 36). In Denmark, Sweden, the United Kingdom, Belgium, the Netherlands, and France, wheat prices are lower than in Austria. 19/ In the rest of the countries they are higher. Prices paid to farmers for rye are relatively high in Austria which also holds true for Norway, Switzerland, Western Germany, Luxembourg, and Denmark. Rye is used partly for a bread grain in these countries while in the western and southern states rye is used primarily for feeding and its price is even lower than that of other feed grains. In comparison to Austria, prices paid to farmers for barley are higher in Norway, Switzerland, Western Germany, and Belgium; the price of oats in most European countries is above the Austrian level. Only in France, the Netherlands, and Denmark do farmers receive less than Austrian farmers. Imported barley and maize for feeding are supplied at lower cost in Denmark, the United Kingdom, France, Italy, and Spain, but are more expensive in the other countries.

Milk. The milk market is regulated by means of compensation levies placed on processing enterprises which in turn are allocated to the factories according to milk utilization and transport costs in such a way that producer prices for milk (on the one hand) and consumer prices for fluid milk and dariy products (on the other) are equal over the whole country. At present, farmers receive AS 1.90 per liter of 3.5 percent FCM. The price and cost equalization procedures are carried out by the Milk Board. This task is a comparatively easy one because 87 percent of total milk deliveries are collected by dairy cooperatives. Their top organizations also balance the market supply between regions of surplus milk production (in relation to regional demand) and those areas where deliveries cannot meet the local requirements. The quantity of dairy products which cannot be absorbed by the home market is exported. In order to reduce costs, each dairy enterprise is assigned a fixed region for milk collection, and likewise, areas are indicated which each factory has to supply.

Since Austrian milk production has exceeded domestic demand, surplus stocks must be sold abroad. In 1960, 5,340 tons of butter and 6,056 tons of cheese (i. e. , 18 percent and 28 percent of total output), as well as minor quantities of fresh whole milk from herds free of tuberculosis, and 5,210 tons of whole milk powder were exported. In previous years, exports reached about the same level.

Dairy products (first of all butter and dried milk) have to be exported at prices below the domestic level, although any purchase tax paid is refunded by the Government. The export of dairy produce and the production of skim milk powder are subsidized from the "Crisis Fund" which was created in 1954. From 1954 to 1959 the expenses of this fund could be covered from the levies to be paid by the farmers on their milk deliveries (which

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19/ For purpose of comparison, national currencies have been converted on the basis of official exchange rate.

are deductions from the producer milk price warranted by the government). In this way, agriculture carried a share of the market risk. Since the rate of price deduction varied according to the market situation, this measure regulated to some extent the volume of milk production.

Table 39. - Prices paid to farmers for important grain commodities in Western Europe, March 1961

Country	Wheat	Rye	Barley	Oats
	AS per kilogram 1/			
Western Germany	2.93	2.67	2.50	2.20
Netherlands	1.84	1.40	1.61	1.30
Belgium	2.54	1.92	1.97	1.98
Luxembourg	2.87	2.92	–	
France	2.08	1.72	1.80	1.27
Italy	2.95	3/ 2.28	–	4/ 2.18
Denmark	2.15	2.07	1.46	1.40
Sweden	2.36	2.16	1.92	1.92
Norway	3.40	3.14	2.67	2.34
United Kingdom 2/	1.39	1.46	1.27	1.29
Switzerland	4.10	3.52	–	–
Austria	2.59	2.39	1.89	1.98

1/ Converted on the basis of the official exchange rates.
2/ Excluding payments effected under the agricultural price guarantee provisions.
3/ Average of January 1961.
4/ Average of February 1961.

Source: Zentrale Markt- und Preisberichtstelle der Deutschen Landwirtschaft G. m. b. H; producer prices (the oat prices indicated for France, Italy, and Austria are wholesale quotations).

Since 1960, however, the amounts of export subsidies granted by the Crisis Fund have been larger than the receipts because the levy to be paid by producers had been reduced to AS 0.02 per liter of milk delivered, and the deficit of the Fund had risen to AS 50 million by April 1961. To raise the volume of domestic sales and to cut down the losses from exports at lower prices, milk producers were required to buy back from the dairy 1/4 kilogram of butter plus 1/4 kilogram of cheese per 100 liters of milk delivered. Otherwise, they have to pay a penalty into the Crisis Fund amounting to AS 12 per kilograms of butter and AS 6 per kilogram of cheese.

On July 1, 1961, the government-controlled consumer price for milk was raised by an additional charge of AS 0.10 per liter and from January 1962 on by another 0.10 AS. This payment flows into the Crisis Fund and will be used for subsidizing butter exports. The levy to be paid by producers will remain at the present level of AS 0.02 per liter. Moreover, the price control of some dairy products has been lifted, and only butter and fluid milk continue to be sold at prices fixed by the government.

As far as imports of dairy products are concerned, only cheese and cottage cheese are liberalized. If import prices are below the domestic level, compensatory import levies are raised.

With the exception of Italy, Belgium, and Denmark, in 1959/60 prices received by farmers for milk were higher in most of the Western European countries than in Austria. Among the 12 European countries for which comparable quotations were available, butter and cheese prices were by March of 1961 above the Austrian level in 6 countries and below the Austrian level in the other 5 countries (table 40).

Other products. Trade margins and retail prices for sugar are regulated on the basis of the General Price Control Act. The sugarbeet price is determined each year by negotiations between farmers' organizations and factories on the basis of long-term general agreements and of the average sugar content. Industry and wholesale trade exercise a system of private freight cost pooling for the purpose of equalization of consumer prices all over the country. Sugar imports are bound to quota and subject to heavy duty. Since at present production exceeds demand, no imports have taken place since 1960.

As in most other countries, Austrian sugarbeets are grown on a contractual basis. Due to low world market prices, production has been limited to the level of domestic demand. The factories pay the regular price only for that quantity of sugarbeets assigned to the producer on the basis of his volume of deliveries from 1956 to 1958. Since quantities are contracted, rather than areas, the accumulation of surplus stocks is prevented which might occur if decreases in acreage are overcompensated by increased yields. In the future, the surplus from exceptionally large harvests (as in 1960 in consequence of high yields and above average sugar content) will be stored, exported, or processed for feeds (dried beets). Since dried or exported beets yield far lower producer prices than beets utilized for the production of sugar for the domestic market, producers received less than one-fourth of the regular price and the risks of overproduction are carried entirely by the sugarbeet farmers.

Colza production also is bound to contracts with the fat industry, and producer prices are fixed. The volume of output amounting at most to 7,000-8,000 tons a year is relatively small and is not to be expanded in the future.

The domestic market for potatoes is not regulated. Some 100,000 to 120,000 tons (about 3 percent of total production) go into industrial uses and are processed for starch, starch derivatives, and alcohol. The deliveries are also based on contracts with the industry. On the average, 10 percent of the output is used for seed, a further 20 percent for human consumption, and 57 percent goes into livestock feeding. The volume of foreign trade in potatoes for human consumption (20,000 tons in 1960-61) and minor quantities of seed. From April to June, early potatoes are imported. The foreign trade in potatoes is not liberalized.

Table 40. - Milk, butter, and cheese prices in the Western European countries, 1959-60 and 1961

Country	1959/60 1/	March 1961 2/	
	Milk	Butter	Cheese
	Austrian schillings per kilogram 3/		
Western Germany	2.08	39.09	24.64
Netherlands	1.98	25.95	13.34
Belgium	1.63	43.30	14.72
Luxembourg	–	40.47	23.65
France	1.90	32.65	25.16
Italy	1.87	31.67	25.6
Denmark	1.63	21.75	12.75
Sweden	1.23	31.34	23.45
Norway	2.63	28.65	20.50
United Kingdom	2.47	4/ 17.94	5/ 16.72
Switzerland	2.49	58.01	27.07
Austria	1.90	31.42	19.70

1/ FAO, prices of agricultural products and fertilizers in Europe 1959/60 (producer prices).

2/ Zentrale Markt- und Preisberichtstelle der Deutschen Landwirtschaft G. m. b. H; dairy price of grade-A butter (France: wholesale price; United Kingdom: London quotation of New Zealand butter). Cheese: wholesale cost or dairy price.

3/ Converted on the basis of the official exchange rates.

4/ Excluding payments effected under the agricultural price guarantee provisions.

5/ February 1961.

Grapes for wine can be grown only in special regions where a favorable climate prevails. About 2 percent of the arable land area is devoted to grapes. Although legal provisions were put in force to prevent expansion of vineyard area and overproduction, they have never been applied. 20/ Total wine production varies according to the prevailing weather conditions between 0.8 and 1.8 million hectoliters. Domestic prices are not regulated. Since imports are limited and high protective tariffs are applied, prices are considerably higher than in the major wine-producing countries (France, Italy, Spain, Greece, Northern Africa). The annual volume of imports (mostly from Italy) ranges

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20/ Federal Law of July 16, 1952, BGBL Nr. 176, concerning "Some provisions for the regulation of agricultural production." The bill was annulled on June 30, 1956.

between 80,000 and 350,000 hectoliters, and some 35,000 to 55,000 hectoliters are exported, mainly to Western Germany.

For fruit and vegetables, there are no market or price regulations in force, but the domestic market is protected by import restrictions when indigenous supply can meet demand. The import duties are applied on a sliding scale; they are highest when domestic supply reaches its top level and lowest when deliveries decline or cease. In times when no domestic produce is offered, duties are not imposed and import licenses are issued freely. During the seasons when domestic deliveries begin or decline, the quantity of imports is limited. As a rule, during the season of highest domestic deliveries imports are blocked (four-phases-system). On the average during the period from 1954 to 1958, domestic production supplied 83 percent of the requirements of fresh fruit (excluding southern fruit) for human consumption and industrial uses, and 89 percent of the demand for vegetables.

In the climatic regions suited for wine and maize production, some 1,500 to 2,000 farmers are growing tobacco on a total area of about 500 hectares. The government monopoly buys the crop at fixed prices which, however, are higher than the prices of the qualitatively superior foreign tobaccos. Domestically produced tobacco is processed for low-priced brands. The rather low quality of domestically grown tobacco limits its use to about 10 percent of the total requirements of raw tobacco while 90 percent is supplied by imports. Economically, tobacco cultivation in Austria is a rather controversial issue. The Austrian Tobacco Monopoly, a government agency, controls production and importation of tobacco in Austria. During the war and in the immediate period thereafter, domestic production was justified by the scarcity of raw materials. At present, tobacco production is continued for social and employment policy reasons.

The market for livestock and meat is controlled by the "Fund for Livestock and Meat" according to the provisions laid down in the Market Regulation Act. In 1960, requirements were covered at 94 percent (and if exports of slaughter animals are included, at 98 percent) by domestic agriculture. The import of such livestock as racing horses, mules, calves for slaughter, sheep, goats, poultry, game, and wild birds as well as slaughtered poultry, game, wild birds, and poultry meat is liberalized. For all other kinds of slaughter animals, the Federal Ministry of Agriculture and Forestry fixes import and export quotas on the basis of the foreign trade programs prepared by the Fund. For transactions to take place in the period from January to April, plans must be submitted by December 31 of the preceding year. For the rest of the year, the trade programs have to be turned in prior to April 30. When imports are to take place, tenders are invited. If c. i. f. prices are below the comparable quotations on domestic markets, compensatory levies are raised. Animals for breeding or for other nonslaughter uses may be exported freely, but the export of slaughter animals is subject to certain limitations. An annual poultry quota of 1,800 tons (fattened hens, ducks, and geese) for fattening or for slaughter may be imported duty free. For imports beyond this level, tariff rates may be reduced or not applied at all.

For the St. Marx hog market in Vienna, special regulations have been established. If average hog prices fall below AS 13 per kilogram of live weight, part of the supply is taken out of the market and is stored or exported. If prices exceed the level of AS 14, imports are admitted ("price-corridor mechanism"). There exist similar arrangements for beef cattle, slaughter horses, and veal calves which are negotiated between the Chambers of Agriculture, of Commerce and Industry, and of Labor. The costs of storage and of deep freezing as well as occasional subsidies for hog exports are carried by the government. So far, these costs could be covered in part by the revenues from the compensatory import levies.

To keep better control of the market and to regulate the seasonal fluctuations of supply by means of market interventions and imports, the Provincial Governors are entitled to declare certain city markets as being "temporarily protected." This measure prohibits direct purchases of slaughter animals at the farm. However, up to the present this regulation has not been put into practice.

Agricultural enterprises producing sugarbeets or potatoes for industrial uses are required by law to fatten one head of cattle per 30 tons of sugarbeets delivered or per 20 hectoliters of their alcohol distilling quota. Half of the railroad freight costs for the animals shipped from the alpine breeding regions to the beet and potato growing areas are refunded from the federal budget. Moreover, interest reductions of AS 45 to 80 are granted for purchase loans made available by the Cooperatives' Central Bank as well as a fattening premium of AS 350 per head of cattle if the animal is sold on domestic markets. If cattle fattened under this law are exported, the tenders receive an export premium of AS 0.30 to 0.40 per kilogram of live weight. This regulation is intended to promote the sale of young cattle raised in alpine regions at fairly profitable prices.

No regulations are applied to the domestic egg market and domestic production covers some 85 to 90 percent of requirements. Under a duty-exemption scheme, an annual quantity of 40 million eggs may be imported for the purpose of coolhouse storage. If further imports are needed, the duty payments may be reduced or full exemption may be granted by the Federal Ministry of Finance upon recommendations of the Federal Ministries of Interior, Agriculture, and Forestry. The recommendation with respect to import requirements are worked out by a committee of representations of the three Chambers are equally represented.

Austria, together with Denmark, has the lowest prices for beef cattle in Western Europe and is wholly competitive in the export business with regard to quality standards as well as to prices (table 41). Hog prices are lower in Denmark, equally high in the Netherlands, but higher in all other countries. In Denmark, France, Sweden, the Netherlands, and Belgium, egg prices are below the Austrian level, but they are higher in the other European countries.

3. 2 Policies for Structural Improvement

Austrian agriculture suffers from serious structural deficiencies. According to the census of 1951, of the total 432,848 holdings of more than 0.5 hectares, 24 percent were smaller than 2 hectares, and 67 percent had an area of less than 10 hectares; about 32 percent formed an area between 10 and 100 hectares, while the size group from 100 to 1,000 hectares included 1.3 percent, and that of 1,000 hectares and over included only 0.1 percent of the total number of agricultural enterprises. Small and medium-sized holdings are predominant in Austria, especially in Burgenland which borders Hungary.

Since 1951 the number of small-sized farms has declined and the proportion of medium-sized holdings has increased. From the economic point of view this development is desirable since larger holdings can use farm machinery more efficiently and reduce production costs. A number of nonviable units has disappeared and the operators took industrial employment. In the Netherlands, during a period of 5 years, about 8 percent of the holdings of less than 5 hectares were given up compared with about 16 percent in Western Germany over a 10-year period. The extent of structural changes which have occurred in Austria since 1951 cannot be appraised until the results of the census of 1960 are available. From 1930 to 1951, only minor shifts took place. During this period, the number of units of less than 2 hectares decreased by 13,570 (a decline of 11 percent), the number of farms with 2-5 hectares increased by 4,653 (a rise of 5 percent), and those [of medium-sized holdings] with 5-20 hectares increased by 8,971 (a rise of 6 percent).

Compulsory land reform schemes for breaking down large estates and allocating the land to small farmers have not been practiced in Austria. However, the authorities granted long-term loans on the purchase of land and allocated vacant areas to small and medium units. Up until now it has not been feasible, however, to carry out any large-scale projects for increasing the area of undersized holdings since the supply of land is limited. From 1957 to 1960, only 21,155 hectares were transferred from large estates into the property of 8,877 farmers with the help of land-purchase cooperatives.

Undersized holdings are being given up because they do not offer any possibilities for raising the productivity of labor and for improving agricultural income. In general, such units are oversupplied with labor. On the other hand, such farms cannot be operated by a single man since large investments would be required. Frequently, the use of farm machines on a cooperative basis is impossible because of small fields and long distances between the plots. However, small holdings will remain viable in the future in regions where (owing to specific topographic and climatic conditions) intensive grassland farming combined with livestock production is practiced, where possibilities exist for additional income from nonfarm sources, or where there are favorable production and market conditions for specialty crops such as fruits and vegetables and wine. In 1959, for instance, the imputed returns to labor (value added minus interest on working capital divided by the number of labor units) derived from farms of from 5 to 10 hectares did not differ greatly from the results achieved by enterprises in the size group of 20 to 50 hectares (table 42). When the small-sized group (5-10 hectares) is compared with the higher-sized group (20-50 hectares), the imputed return to labor was only 6 percent smaller for wine grapes and other farm crops in the Lower Austrian plains and hills, only 2 percent smaller for crop-grassland farming in the sub-alpine region, and only 1 percent smaller for grassland farming in the sub-alpine region. The proportion of nonfarm income in total revenues, however, was higher for the size group of 5-10 hectares (amounting to 10 percent, 17 percent, and 19 percent for the types of farming indicated above) than for the holdings of 20-50 hectares (4 percent, 12 percent, and 16 percent, respectively).

The level of imputed returns to labor varies not only by size groups but also by production regions. In the flat or hilly parts of the country with consolidated structural conditions and favorable size distributions, technological progress was considerable during the past decade. Since these regions are endowed with fertile soils as well as with climatic advantages and are benefiting from the neighborhood of industrial zones (close to markets), these enterprises achieved relatively high rates of profits. Regions of predominantly small-scale holdings as well as mountainous farming areas (which have to produce under adverse natural conditions) were heavily retarded. In 1959, the imputed return to labor was highest in the plains and hills of Lower Austria averaging AS 10,420, and lowest in the Mühlviertel and the Waldviertel amounting to only As 7,758 (table 43). The level achieved in the high-alpine production region (As 8,316) which is least suited for farming was higher than in the hilly land of the Mühlviertel (in Upper Austria) and of the Waldviertel (in Lower Austria) because the mountain farmers have benefited from the relatively high timber prices and from incomes derived from the tourist trade. Both economic and socio-economic factors are considered in promoting underdeveloped regions because there are meta-economic grounds (primarily with respect to settlement policy) on which the support of hardly viable units is justified within the framework of regional development planning.

In many parts of the country, agricultural holdings are greatly fragmented, which limits the efficiency of management. In recent years, some 16,000 to 18,000 hectares were consolidated each year, and the total area covered by such schemes since 1890 amounts to 380,000 hectares. However, about 1.1 million hectares are still to be consolidated, of which 590,000 hectares are of urgent need.

Owing to the continuous expansion of mechanization, consolidation should be speeded up, but so far all efforts made have been rather ineffective due to the lack of funds and of technical personnel. If the most urgent schemes were to be completed within the next 12 years, an annual coverage of 50,000 hectares would be required which is three times as much as the area consolidated in recent years.

According to the official register of land improvement, 319,000 hectares are to be drained and 169,000 hectares irrigated. About 40,000 of these hectares are in small and medium farms.

The General Agricultural Act provides for the allocation of federal grants and of interest subsidies for the execution of structural improvements whereby special consideration is to be given to mountain farming areas. For measures indicated under Section 9, second paragraph of this Act, the Government in 1961 spent AS 200 million (table 44). From 1962 on, agriculture will ask for a support level of AS 500 million. For the improvement of basic production conditions, farm roads, structural deficiences, and management practices, AS 131 million were allocated in 1961 which is to be increased to about AS 361 million in the next few years. Other federal grants include the amounts spent for sales promotion and social measures. Apart from the direct support programs, the Government subsidizes the interest rates on loans granted for certain kinds of investment. By 1961 the total volume of these loans was about AS 970 million. By this program, the standard interest rate of 8 percent is uniformly reduced to 3 percent (and for reforestation schemes, to 1 percent). In general, these investment credits are granted on 10-year terms and for farm machinery on a 5-year term.

As in other countries, there are in Austria so-called underdeveloped regions of low standards of living and weak economic (development areas). For these zones, development plans have been prepared for the adjustment of agricultural production, and special funds have been allocated for these projects. In the main, these development regions are typically rural areas with unfavorable size distributions, poor soils and labor surplus. By means of direct industrialization policies and the promotion of tourist catering trades, new sources of income are to be created.

Table 41. -- Prices of slaughter animals and eggs
in Western European Countries, March 1961

Country	Per kilogram of live weight 1/				Per egg
	Oxen	Cows	Bulls	Hogs	
	Austrian Schillings				
Western Germany	13.57	13.09	16.15	16.15	0.99
Netherlands	–	11.42	13.15	13.11	0.82
Belgium	13.67	12.83	13.48	14.40	0.85
Luxembourg	12.86	10.04	12.54	15.19	–
France	12.39	12.39	10.22	14.54	0.77
Italy	15.09	11.83	15.40	15.11	0.99
Denmark	10.05	8.03	10.16	(14.51)	0.59
Sweden	(24.85)	(24.85)	(27.28)	(21.72)	0.87
Norway	–	(20.99)	(23.93)	(18.42)	1.07
United Kingdom 2/	10.80	7.35	–	10.36	0.90
Switzerland	18.13	16.01	19.92	18.49	1.21
Austria	11.76	9.45	11.84	13.36	0.91

1/ Converted on the basis of the official exchange rates.
2/ Excluding payments effected under the agricultural price guarantee provisions.

Source: Zentrale Markt- und Preisberichtstelle der Deutschen Landwirtschaft G. m. b. H; for slaughter animals, market quotations for grade-A product (Luxembourg and Switzerland: farm gate prices). Eggs: wholesale cost (France, Norway, and Austria are wholesale prices and Sweden and Switzerland are farm gate prices). Quotations in parentheses refer to carcass weight.

4. Foreign Trade in Agricultural Products and European Integration

4. 1 The Regional Pattern of Foreign Trade in Agricultural Products

The distribution of food exports (S. I. T. C. Code, Section O, Food) in 1960 by regions of destination was as follows: Out of a total of AS 1.27 billion, AS 1.07 billion or 84 percent were exported into EEC countries, AS 0.12 billion or 10 percent into European Free Trade Area (EFTA) countries, and AS 0.08 billion or 6 percent into other countries (table 45). The Common Market region bought 94 percent of all livestock and meat exported, 73 percent of the dairy products, 88 percent of the fruit and vegetables, and 77 percent of the wine exports; the corresponding proportions of total food exports shipped to EFTA countries were only 2 percent, 23 percent, 4 percent, and 6 percent respectively. Austrian agricultural exports depend heavily on the EEC-markets, particularly on Germany and Italy, because the EFTA-countries - with the exception of Great Britain and eastern Europe - are to a large extent self-sufficient with respect to food commodities. The export of live animals into EFTA-countries would also be difficult because of high freight costs. Great Britain as the world's leading importer of agricultural products would provide a market, but Austrian agriculture could hardly meet the competition of other exporting countries because they either enjoy preferential tariffs - like the primary producing countries of the Commonwealth, or they are more efficient and produce at lower costs due to more favorable natural conditions - as for example, Denmark or the Netherlands.

Table 42. - Imputed returns to labor, by type of farming, production region, and size of farms, 1959, Austria 1/

Type of farming and production region	Size group	Imputed returns to labor	
		AS per hectare of agricultural area	AS per labor unit
Wine and crops			
Northeastern plains and hills	5 - 9 hectares	3,271	7,959
	10 - 19 "	2,593	9,327
	20 - 50 "	1,572	8,452
Crop and grassland			
Sub-alpine region	5 - 9 "	2,350	9,437
	10 - 19 "	2,533	9,312
	20 - 50 "	1,889	9,589
Grassland			
Subalpine region	5 - 9 "	3,815	9,732
	10 - 19 "	3,073	10,075
	20 - 50 "	2,004	10,891

1/ Value added minus interest rates.

Sources: "Die Büchführungsergebnisse aus der Osterreichischen Landwirtschaft, 1959," Land- und Forstwirtschaftliche Landes-Büchführungs-Gesellschaft Wien (Agricultural Accounting Company, Vienna).

Table 43. - Imputed returns to labor 1/ in 1959, by production regions, Austria

Production region	Imputed returns to labor	
	AS per hectare of agricultural area	AS per labor unit
Northeastern plains and hills	2,209	10,420
Southeastern plains and hills	3,202	8,274
Sub-alpine region	2,419	9,754
Carinthian valley	2,122	9,354
Wald- und Mühlviertel	1,730	7,758
Eastern pre-alpine	1,926	7,893
Northern pre-alpine region	1,858	7,966
High-alpine region	2,287	8,316
Federal average	2,236	8,734

1/ Value added minus interest on working capital.

Source: Land-und Forstwirtschaftliche Landes-Büchführungs-Gesellschaft Wien (Agricultural Accounting Company, Vienna), "Die Büchführungsergebnisse aus der Österreichischen Landwirtschaft 1959."

Although Austria's exports of agricultural produce are comparatively small - the value of foodstuffs and beverages exported in 1960 amounted to only 7 percent of total agricultural output -- exports are of great importance for certain products and regions. The trade relations of the western Provinces with the EEC-countries are particularly close. The export of breeding and other animals (not for food use), as well as butter and cheese has become more important to the farmers in western regions because (1) The demand for breeding animals in the eastern part of the country has declined and (2) Milk production exceeds domestic demand.

In contrast to the agrarian exports which concentrate on the EEC-region, agricultural imports are scattered worldwide. The imports of food and feeds (S. I. T. C. Code, Section O) totalling AS 4.88 billion in 1960 were distributed as follows: AS 1.21 billion or 25 percent were purchased from EEC-countries, AS 0.21 billion or 4 percent from the EFTA-region, AS 1.41 billion or 29 percent from countries of the Eastern Bloc, AS 0.33 billion or 7 percent from the U. S. A., and AS 1.72 billion or 35 percent from other countries (table 46). The Eastern European countries accounted for 75 percent of total livestock and meat imports (Poland 28 percent, Hungary 23 percent), for 39 percent of coarse grain and other feed imports (Yugoslavia 19 percent), for 23 percent of bread grain imports (Yugoslavia 12 percent), and for 10 percent of fruit and vegetable imports. Imports from the EEC-countries accounted for 52 percent of total fruit and vegetable imports (Italy 47 percent), 14 percent of all livestock and meat imports, and 13 percent of coarse grain and other feed imports. The shares of the United States in total imports amounted to 19 percent for coarse grains and other feeds, 4 percent for bread grains, and 4 percent for fruit and vegetables. Food commodity imports from the EFTA-countries were negligible.

Table 44. - Expenditure under the "Green Plan" (according to the provisions of the General Agricultural Act, Section 9, second paragraph) Austria

Item	Version I		Version II	
	Federal grants	Agricultural investment loans	Federal grants	Agricultural investment loans
	Million AS			
Improvement of basic production conditions 1/	76	42	33	28
Improvement of farm roads 2/	103	56	39	47
Structural and managerial improvements 3/	182	275	59	214
Sales promotion 4/	93	48	31	26
Housing construction for farm workers	20	42	15	38
Other credit facilities 5/	26	450	23	617
Total	500	913	200	970

1/ Research and experimental work, advisory service, promotion of breeding for performance and quality, flood control, drainage and irrigation, reforestation etc.

2/ Forest roads, alpine transport facilities; cable winches; electrification.

3/ Land consolidation, settlement schemes, increase of holding size, holding preservation schemes, development programs, improvement of barn and manure disposal constructions.

4/ Bovine tuberculosis and brucellosis eradication; sales promotion, advertising, and development of new markets.

5/ Mechanization of small-sized and mountain farms; improvement of housing and farm buildings; other credit policies.

The share of imports from "other" countries is remarkably high. In 1960, the respective proportions amounted to 69 percent for bread grains (Canada 36 percent, Argentina 26 percent, and Australia 6 percent), 28 percent for coarse grains and feedstuffs (Argentina 16 percent, Spain 7 percent, and Turkey 6 percent). Imports of citrus fruit were distributed as follows: Ecuador 19 percent, Spain 13 percent, Greece 5 percent, and Turkey 4 percent. The distribution of agricultural imports from many countries is ultimately explained by the pattern of Austrian industrial exports.

While total foreign trade in agricultural products shows a sizable import surplus, exports to and imports from EEC-countries are approximately in balance. In 1960, total net imports of food commodities and feedstuffs (S. I. T. C. Code, Section O) amounted to AS 3.61 billion or almost three times the value of total agricultural exports. However, total trade with the EEC-countries involved net imports of only AS 145 million or 14 percent. Relatively large net imports of fruits and vegetables (AS 636 million) and of feedstuffs (AS 55 million) were approximately offset by export surpluses of livestock and meat (AS 618 million) and of dairy products (AS 182 million).

As a consequence of the strong concentration of Austrian exports on the EEC-area, the future development of Austria's economic relations to the Common Market countries is of paramount importance to domestic agriculture.

4.2 Austria's Export Chances as an Outsider of the EEC

If Austria remains outside the EEC, importing agricultural products will encounter increasing difficulties on EEC-markets.

So far, the internal EEC-tariffs have been reduced by 20 percent for liberalized commodities, and up to 25 for nonliberalized items. Since internal tariff reductions are not conceded to nonmember countries, the duties on agricultural imports from Austria already are in some instances considerably higher than on imports from member countries. The discrimination in tariffs (as percentage of commodity value) amounts to 3 percent for beef cattle, 1.5 percent for cattle other than for breeding or for slaughter (valid only for exports to the German Federal Republic), 4 percent for horses, 3 percent for milk and dairy products, and 15 percent for wine. The resulting effect of discrimination as calculated for the present volume of exports amounts to about AS 30 million on an annual basis.

Beginning with January 1, 1962, the rate of internal tariff reduction for agricultural products will uniformly amount to 30 percent (and 40 percent for industrial products). At the same time, the external tariffs on all agricultural commodities will be adjusted to the nonreduced common tariff unless there is an overall 20-percent reduction of the common tariff. Negotiations concerning this step are presently under way on the GATT-level. The forthcoming regulations will involve in most cases an increase of the present tariffs applied to agricultural imports from Austria, although the EEC authorities have made various concessions in the course of GATT tariff adjustment negotiations.

In the future, the common external tariff for cattle for slaughter will amount to 16 percent or about the present level applied by Italy, but higher than that of the German Federal Republic (10 percent). The external tariff on cattle to be used for milk and meat production will also be 16 percent, but Austria may be conceded a preferential tariff of 6 percent. Furthermore, Italy, which at present imports this cattle category under duty-exemption, will classify qualitatively superior nonslaughter animals as breeding animals. They will remain under the exemption. In the case of cheese and butter, the EEC will establish a price adjustment levy instead of a tariff, amounting to the differential between the export price and the domestic price on the EEC market. The common tariff for wine will be at the present German level.

The tariff discrimination will have no major short-run effects on the Austrian agricultural export situation. This holds particularly true for livestock exports which are of vital importance for the alpine farms. In the EEC area, per capita consumption of beef will presumably rise from its present level of 18.2 kilograms to 23.2 kilograms in 1965. Because production cannot keep pace with the large increase in demand the short-term export prospects are likely to be still favorable with regard to cattle for slaughter and for fattening. (The German Federal Republic has conceded to Austria an annual export quota by 1963 of 10,000 head of cattle for slaughter, and of other cattle up to the value of DM 13.5 million). Breeding animals will further remain duty exempt and in the case of animals other than for slaughter or breeding, Austria will get certain preferential arrangements. According to a statement by Minister Mansholt a tariff formula for cheese will be offered at the GATT negotiations which will enable Austria to maintain her present level of cheese exports. But it will not be possible to sell butter in the EEC, because the Common Market countries already produce more butter than they consume and are, therefore, considering various measures to prevent further production increases.

In the long-run, however, Austria's agricultural exports could be hurt seriously in the absence of an agreement with the EEC. According to the findings of a panel of experts, the degree of self-sufficiency of the EEC will rise in the long-run, and the demand for agricultural imports will decrease. There is already a sizable surplus of sugar, butter, and wine. By 1965, the demand for soft wheat will fully be met by internal production and by 1970, the EEC will probably be almost self-sufficient in the food sector. Under these circumstances an outsider who is subject to tariff discrimination will meet increasing difficulties in maintaining its level of exports even if the Community – as its representatives have repeatedly assured – pursue a relatively liberal foreign trade policy and continue the exchange of agricultural products with traditional trading partners. The competition of France and the Netherlands will be particularly strong because these countries partly produce at lower cost and partly have large productive reserves.

4.3 The Effects of an Association with the EEC

On the ground of political considerations arising from her position of neutrality, Austria – like Sweden and Switzerland – cannot join the EEC as a full member but only as an associate. But even in such a status, Austria would be required to adjust her agrarian policies to the agricultural program of the EEC and to adopt at least the most important measures of market regulation.

At the present time it is difficult to assess in detail the consequences of participation in the common agricultural market since so far the agricultural program of the EEC has been outlined only in its general principles. Many important problems, especially with regard to agricultural prices, have not been resolved due to the different economic preconditions in the various countries. In general, integration into a European market will not be too harmful to Austrian agriculture. As indicated earlier, producers' prices of the main products are at a medium level in Austria, and various products (especially livestock, cheese, to a lesser extent, and some special varieties of fruit) are without doubt competitive on international markets. These products could be sold more easily on the EEC market (which is liberalized internally but protected against external competition) than on the EFTA markets. Also, the strict market regulations planned for the major part of products will meet the requirements of the domestic economy. The representatives of Austrian agriculture have, therefore, always argued in favor of an agreement with the EEC by bilateral or multilateral negotiations.

Table 45. – Regional pattern of agricultural exports, by commodity groups, 1960, Austria

Commodity groups	S.I.T.C. Code	Total exports Million AS	Distribution of total exports by regions of destination					
			EEC		EFTA		Other countries	
			Million AS	Percent	Million AS	Percent	Million AS	Percent
Live animals, chiefly for food; meat, and meat preparations	00, 01	755.2	712.4	94.3	17.2	2.3	25.6	3.4
Dairy products, eggs, and honey	02	346.7	252.9	72.9	80.4	23.2	13.4	3.9
Fish and fish preparations	13	5.0	1.6	32.0	1.4	28.0	2.0	40.0
Cereal and cereal preparations (excl. feed grains)	04 (excl. 043, 044, 04502, 04509)	25.5	18.5	72.5	2.6	10.2	4.4	17.3
Feed grains and other feedstuffs	043, 044, 04502, 04509, 08	26.0	14.7	56.5	8.3	31.9	3.0	11.6
Fruits and vegetables	05	59.6	52.2	87.6	3.7	6.2	3.7	6.2
Sugar and sugar preparations	06	28.6	6.0	21.0	2.4	8.4	20.2	70.6
Coffee, tea, cocoa, spices, and manufactures thereof	07	14.2	3.9	27.5	5.0	35.2	5.3	37.3
Miscellaneous food preparations	09	8.0	4.8	60.0	2.0	25.0	1.2	15.0
Total food	0	1,268.9	1,066.8	84.1	123.1	9.7	79.0	6.2
Wine	112-01	21.0	16.2	77.1	1.3	6.2	3.5	16.7

Table 46. – Regional pattern of agricultural imports, by commodity groups, 1960, Austria

Commodity groups	S.I.T.C. Code	Total imports Mil. AS	Distribution of imports by regions of origin									
			EEC		EFTA		Eastern Bl.		U.S.		Other Countries	
			Mil. AS	Per-cent	Mil. AS	Per-cent	Mil. AS	Per-cent	Mil. AS	Per-cent	Mil. AS	Per-cent
Live animals, chiefly for food; meat and meat preparations	00,01	676.6	94.6	14.0	29.1	4.3	505.2	74.7	2.0	0.3	45.7	6.7
Dairy products, eggs and honey	02	252.9	70.6	27.9	31.6	12.5	108.7	43.0	6.0	2.4	36.0	14.2
Fish and fish preparations	03	227.1	88.2	38.8	80.7	35.5	44.3	19.5	0.1	0.1	13.8	6.1
Cereal and cereal preparations (excl.feed grains)	04 (excl. 043,044, 04502,04509)	603.7	103.7	17.2	10.4	1.7	114.7	19.0	21.9	3.6	353.0	58.5
Feed grains and other feedstuffs	043,044,08, 04502,04509	1,130.9	69.8	6.2	25.5	2.2	480.7	42.5	239.5	21.2	315.4	27.9
Fruits and vegetables	05	1,327.7	688.1	51.8	12.3	0.9	136.5	10.3	50.8	3.8	440.0	33.2
Of which, citrus fruit		(547.9)	(216.5)	(39.5)	(0.8)	(0.2)	(0.1)	(0.0)	(25.7)	(4.7)	(304.8)	(55.6)
Sugar and sugar preparations	06	19.1	10.2	53.4	3.8	19.9	1.6	8.4	3.1	16.2	0.4	2.1
Coffee, tea, cocoa, spices, and manufactures thereof	07	601.3	56.5	9.4	14.4	2.4	14.2	2.3	2.8	0.5	513.4	85.4
Miscellaneous food preparations	09	36.6	29.6	80.9	2.4	6.5	4.2	11.5	0.3	0.8	0.1	0.3
Total food	0	4,875.9	1,211.3	24.9	210.1	4.3	1,410.3	28.9	326.5	6.7	1,717.7	35.2
Wine	112-01	157.6	113.6	72.1	.0.6	0.4	36.8	23.3	--	--	6.6	4.2

On the other hand, representatives of Austrian agriculture ask for a number of special arrangements owing to special conditions of domestic production. They are needed to reduce the difficulties of adjustment. After careful examination, the Conference of the Presidents of the Chambers of Agriculture has stated its position with regard to integration. 21/

The alpine farms (which are remote from the market and produce under unfavorable natural conditions), the small-sized holdings, and fruit, vine-grape, and vegetable farms are threatened by the competition of southern countries and have to be prepared for integration. This would call for the allocation of larger public funds under the Agricultural Act for structural improvements, and a transitional period would be required of between 12 to 15 years.

The strict market control provided for in the EEC agricultural concept is accepted with minor modifications. There are some reservations concerning the price policy for rye and feed grains. A higher price of rye by means of premiums on acreage or on market deliveries - rye is considered a bread grain in this country - and a stricter market control for feed grains for controlling animal production is asked for Austria. The premiums on rye would have to be paid out of import price adjustment levies or out of special adjustment or stabilization funds. They would have to be high enough to also cover the price differential between the effective price paid by the milling industry and the producers' price. In Austria, this differential has been settled so far by the Mill Compensation Arrangement (lowering the price of rye flour by a levy on wheat).

Furthermore, Austria wants to maintain the uniform producer's price for milk. The system of different prices for fresh whole milk and for milk for industrial processing which is part of the EEC agricultural concept has been rejected in the interest of the alpine farms.

Further demands are concerned with protective periods for imports (import quotas) to protect the domestic production of early potatoes, early fruit, and vegetables, because the climatically favored areas of southern Europe can market these products on an average of 4 weeks earlier and at lower prices. Although Austrian producers can create the climatic conditions of southern countries for vegetables and flowers in greenhouses artificially, their production costs would then be much higher. Also, minimum prices should be fixed for industrial potatoes as well as for syrup and starch products derived from potatoes and maize because of the danger of dumping exports from western European countries. At the present time it cannot be judged how far the EEC will go in making concessions and meeting the demand of Austrian agriculture for special regulations.

In a larger market without import quotas and tariffs between the member countries fruit growing would be most threatened in Austria because on the whole fruit production - apart from some special products such as strawberries, black currants, and apricots - has not yet shifted to marketable varieties and efficient methods. If this is not done during a transition period of 12 years - fruit growing involves long production cycles — imported fruit which is carefully selected, standardized, and packaged will gain decisive advantages. Also, with rising income the tendency of demand to shift from low-grade fruit (mainly for

21/ "Osterreichs Land- und Forstwirtschaft zur Frage der Europaischen Integration," March 9, 1960.

industrial uses) to high-grade fruit (for immediate human consumption), particularly to citrus fruit, will even be stronger than it has been in the past. In the United States, fruit and vegetable growing in the less favorable climatic regions could be maintained after the removal of tariff and transportation barriers and - after certain adjustments — could stand up to competition from its southern areas. But conditions are different in Europe: The distances between production areas and consuming centers are smaller and in the past decade some EEC-countries - especially Italy - have extended production to a level which may give rise to serious dangers of inadequate market outlets.

Vine-grape cultivation which is the basic source of income of 83,000 small and "dwarf-sized" holdings will be similarly endangered, but not to the same extent. A shift in the production pattern would raise difficult social questions and problems of settlement policy. During a longer transition period, production would have to switch to modern methods of vine-grape cultivation, i. e., from the traditional setup of narrow rows of plants to wider rows and higher plants in order to permit the use of tractors. Manual labor in the vineyards would have to be largely mechanized. The number of varieties would have to be increased in order to reduce risks and production costs. With regard to the processing of grapes and the marketing of wine, Austria has already achieved remarkable results. Numerous processing and marketing cooperatives have been established. Thanks to bulk tanks for fermentation and modern treating and filling equipment the co-ops can produce high quality wine. High-grade Austrian wines are of choice quality and their competitive position can certainly be maintained in a larger market. The regulation of wine markets as planned for the EEC-region will presumably stabilize production and prices. The envisaged control of origin and the protection of trademarks will prevent falsifications. Thus domestic products will remain competitive even at somewhat higher prices. A good example is the experience with vine-grape growing in Alsace. When this region became part of France in 1920, the production of low-grade wines had to be abandoned in favor of a shift to high-quality varieties. A strict "wine-statute" restricted the production of low-quality varieties and limited vine-grape growing to the most suitable areas. Although there is an overproduction of wine in France, products from Alsace always find a ready market thanks to their superior quality.

Other products will hardly meet major difficulties of adjustment: Livestock farming would be favorably affected, particularly in the western Provinces, by an association with the EEC. The consequences for grain production will mainly depend on the level of prices fixed by the EEC authorities. If a medium price level were selected, (between the low French prices and high German prices) Austrian farmers would receive less for wheat than they have so far.

Presumably, Austria will not be able, even as an associate, to export surplus stocks of wheat, sugar, and butter to the Common Market countries. Since continued exports of these products to other countries will also be impossible or only possible at rock bottom prices, farm policy makers will have to find ways and means to adjust the production of those commodities, for which there are no export chances, to domestic demand. Methods to restrict production have already been adopted in the case of sugarbeet delivery quotas and of wheat (different price levels for soft wheat and hard wheat). The problem of butter surpluses has partly been solved by increasing the fat content of bottled fresh whole milk to 3.6 percent as against 3.2 percent for unpackaged milk, and by requiring milk producers to buy back 1/4 kilogram butter and 1/4 kilogram cheese per 100 liters of milk marketed.

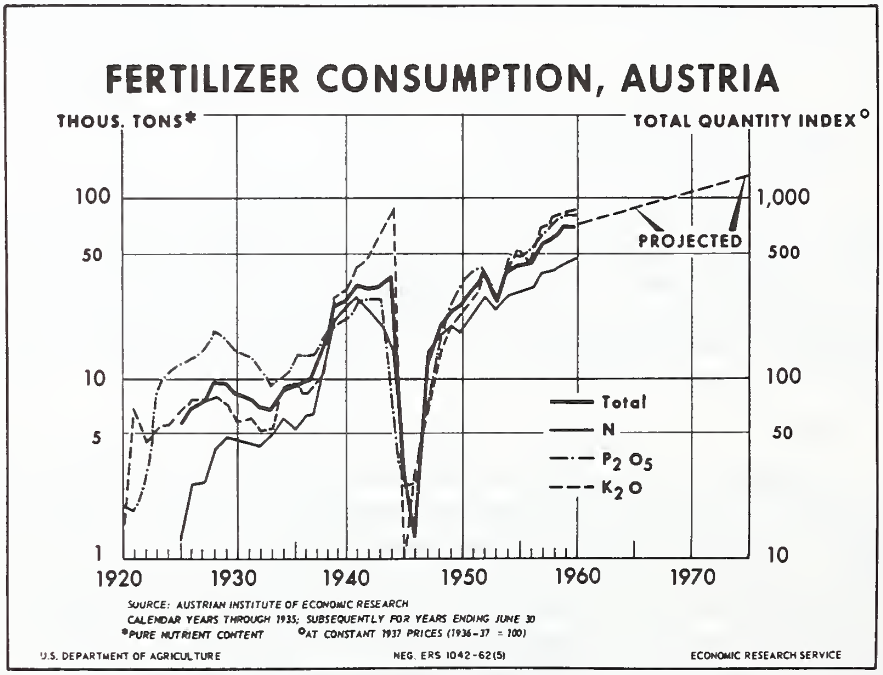
IV. AGRICULTURAL PRODUCTS: PROJECTION OF CROP PRODUCTION LEVELS

The aim of this chapter is to appraise the future output for important crops produced in Austrian agriculture. Future developments in crop production depend upon (i) what happens to crop yields as influenced by a greater use of fertilizer and other technical improvement and (ii) what happens to cropland areas for various kinds of crops based on physical and evolving economic factors. From these specific sources of increased production, both the volume and productivity of future crop production may be appraised.

1. Fertilizer Consumption and Crop Yield

1.1 Fertilizer consumption

Until 1938, Austrian consumption of fertilizers was low because of high prices. It increased rapidly during the war and in 1943/44, about 3.6 times as much fertilizer was applied as in 1936/37 (fig. 3). In the immediate postwar years fertilizer consumption decreased, but by 1951/52 it was up again to the wartime level, thanks to large European Recovery Program imports. In 1959/60, consumption was 6.8 times higher than in 1936/37. The average rate of increase in the period from 1950/51 to 1959/60 was 9 percent per annum, but the annual fluctuations were considerable. In 1956/57, for example, sales rose 28 percent. In 1959/60, however, sales rose only 2 percent. The consumption figures (table 47) indicate the quantity of fertilizers delivered to cooperatives and dealers; the actual consumption of agriculture, therefore, may be slightly different due to inventory changes.



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH
CALENDAR YEARS THROUGH 1935; SUBSEQUENTLY FOR YEARS ENDING JUNE 30
*PURE NUTRIENT CONTENT °AT CONSTANT 1937 PRICES (1936-37 = 100)

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Figure 3.

With a fertilizer consumption of 74 kg. pure plant nutrients per hectare of agricultural land in 1959/60, Austria ranked 9th among the western European countries, below Sweden (80 kg.), but above France (69 kg.), Italy (51 kg.), and Greece (36 kg.). 22/ If it is taken into account that the official statistics overstate the actual area of permanent grassland by about 130,000 hectares (Chapter VI) fertilizer consumption per hectare is figured at 77 kg. Table 48 shows the international comparison of fertilizer consumption in Europe in 1959/60.

In Denmark, Norway, and the German Federal Republic, average fertilizer application per hectare was 135 kilograms, 140 kg., and 167 kg., respectively. In Belgium and the Netherlands the average was 187 kilograms and 207 kg., respectively.

The level of fertilizer application in Germany and the northwestern European countries is considerably higher than in Austria. The figures given in table 48 suggest that consumption can still be increased in Austria, even though conditions for fertilizer application are less favorable than in many other countries. Due to Austria's large share of alpine regions, a large proportion of total agricultural land consists of grassland, namely 55 percent (almost 2.2 million hectares) as compared to only 30 percent in western Germany. Regular fertilizer application on these areas was either not customary because in mountainous areas many farms keep a large stock of animals and use manure intensively as well as fluid material, or the application was not economical because of poor soils, short vegetation periods, and unfavorable transport conditions. Many long-term experiments with fertilization, however, prove that the influence of soil and climatic conditions on the efficiency of fertilization usually is overestimated.

In the region of the Pannonic climate (the flat areas in the eastern part of Austria), grains often ripen prematurely due to drought in June and July. This reduces the formation of starch content, and the nutrients applied to the soil are utilized only in part. These factors are even more pronounced in the Balkan states, in Italy, and on the Iberian peninsula.

In general, fertilizer consumption is high on row crop and on grain crop farms, and low on grassland farms. In Lower Austria, where the proportion of flat and hilly land is greater, and grain farming is more extensive, fertilizer consumption is higher than in other areas of Austria. In 1959/60, in Lower Austria, 105 kilograms pure nutrients ($N + P_2O_5 + K_2O$) were applied per hectare of agricultural area as compared with 73 kilograms in Upper Austria and 65 kilograms in Burgenland (table 49). In the rest of the provinces, fertilizer consumption amounted to 53 kilograms in Vorarlberg, 47 kilograms in Styria, 45 kilograms in Salzburg, 40 kilograms in Tyrol, and 37 kilograms in Carinthia. In the district of Gänserndorf in Lower Austria, where 91 percent of the agricultural area is arable land, fertilizer consumption per hectare was 232 kilograms of pure nutrients. In the district of Neunkirchen, however, where the proportion of arable land amounts to 57 percent, fertilizer consumption was only 36 kilograms.

22/ Alpine pastures and rough grazings were excluded.

Table 47. - Fertilizer consumption, by type, 1920-1960, Austria

Calendar year or crop year (July-June)	1,000 tons of pure nutrients of				Consumption index (1936-37=100)			
	N	P_2O_5	K_2O	Total	N	P_2O_5	K_2O	Total 1/
1920	.	2.0	1.5	.	.	14	17	.
1921	.	1.8	6.8	.	.	13	78	.
1922	.	3.0	4.4	.	.	22	50	.
1923	.	8.9	5.3	.	.	64	61	.
1924	.	11.0	5.5	.	.	79	64	.
1925	1.3	12.0	6.7	20.0	19	86	77	57
1926	2.6	12.7	7.6	22.9	39	92	88	69
1927	2.7	14.8	7.6	25.1	40	107	88	76
1928	3.9	18.8	7.7	30.4	58	136	89	96
1929	4.8	16.7	7.1	28.6	72	121	83	94
1930	4.7	14.0	5.8	24.5	70	101	67	83
1931	4.4	12.9	6.0	23.3	66	94	70	78
1932	4.3	11.1	5.1	20.5	64	81	59	70
1933	4.9	9.2	5.3	19.4	73	66	61	68
1934	6.0	10.1	8.9	25.0	90	73	103	85
1935	5.3	13.3	9.4	28.0	80	96	109	91
1936	6.2	13.5	8.1	27.8	93	98	94	95
1936/37	6.7	13.8	8.6	29.1	100	100	100	100
1937/38	10.9	17.2	10.7	38.8	163	125	124	141
1938/39	21.0	21.7	26.8	69.5	314	157	310	247
1939/40	25.4	40.7	30.7	76.8	381	150	356	278
1940/41	28.2	27.3	41.8	97.3	422	198	484	336
1941/42	24.0	27.8	46.6	98.4	359	201	541	320
1942/43	19.4	27.2	64.5	111.1	291	197	748	322
1943/44	15.1	4.9	84.2	104.2	226	35	976	362
1944/45	3.7	2.8	-	6.5	55	21	-	32
1945/46	-	2.4	2.8	5.2	-	18	33	13
1946/47	13.3	6.9	6.1	26.3	199	50	70	115
1947/48	18.4	16.1	13.6	48.1	276	116	158	189
1948/49	19.6	25.6	18.7	63.9	294	185	217	235
1949/50	17.6	33.3	22.6	73.5	264	241	262	254
1950/51	22.7	39.2	27.1	89.0	340	284	314	312
1951/52	28.7	40.4	38.8	107.9	429	292	450	374
1952/53	24.1	26.5	28.0	78.6	361	192	324	283
1953/54	28.8	48.2	37.8	114.8	432	349	438	398
1954/55	29.8	46.8	50.2	126.8	446	339	582	421
1955/56	31.8	50.1	43.6	125.5	476	363	505	432
1956/57	37.8	62.1	68.8	168.7	566	450	797	553
1957/58	39.5	74.2	76.7	190.4	591	537	889	615
1958/59	42.7	83.0	81.5	207.2	639	601	944	671
1959/60	45.1	80.0	84.0	209.1	673	580	977	681

1/ Quantity index at constant 1937 prices. Source: Austrian Fertilizer Advisory Service.

Table 48. – Fertilizer consumption in Europe, by individual countries, and by type, 1959-60
[Kilograms per hectare of agricultural land] 1/

Country	N	P_2O_5	K_2O	Total
Netherlands	91.8	48.9	66.1	206.8
Belgium	52.4	48.3	85.9	186.6
German Federal Republic	43.5	50.9	73.0	167.4
Norway	48.1	47.3	44.5	139.9
Denmark	39.9	37.9	57.1	134.9
United Kingdom	33.6	35.7	34.5	103.8
Switzerland	12.6	37.1	33.7	83.4
Sweden	27.2	28.5	24.2	79.9
Austria	15.8	28.2	29.6	73.6
France	16.8	29.4	22.9	69.1
Italy	21.1	22.8	6.6	50.5
Greece	19.2	14.5	2.0	35.7
Portugal	16.1	16.0	2.2	34.3
Ireland	4.4	17.6	11.9	34.0
Spain	10.7	12.6	3.5	26.8
Turkey	0.4	0.6	0.1	1.1
OEEC	19.5	23.3	20.9	63.1

1/ Excluding "rough grazings".

Source: OEEC, Fertilizers, 9th study, 1957-60.

1.2 Intensity of Fertilizer Application and Yields per Hectare

Since the thirties, crop yields have increased in part very sharply in Austria. In the period 1958-60, the increase of average yields per hectare over 1936-38 was 36 percent for wheat, 34 percent for rye, 33 percent for barley, and 30 percent for oats (table 50). The yields of corn, potatoes, and sugarbeets were respectively 32 percent, 41 percent, and 50 percent higher. Only the yields of roughage increased relatively slow (clover 30 percent, and hay from meadows 23 percent). The rise in yields is to a considerable degree (according to experts about 50 percent) the result of increased fertilization. Other factors accounting for the gains are the wider use of high-yielding varieties, pest control, better tillage, and more appropriate crop rotation systems.

Since the midfifties, yields of grain crops increased at a lower rate, although fertilizer consumption continued to increase. It appears that the efficiency of additional fertilizer application has decreased (i.e., the marginal returns have diminished). To some

Table 49. – Fertilizer consumption per hectare of agricultural land, by Federal Provinces, 1958-59 and 1959-60, Austria 1/

Province	Kilograms of pure plant nutrients ($N + P_2O_5 + K_2O$)	
	1958/59	1959/60
Lower Austria incl. Vienna	108.8	104.5
Upper Austria	66.9	73.0
Burgenland	69.9	65.4
Vorarlberg	43.3	53.1
Styria	43.0	47.4
Salzburg	41.1	44.7
Tyrol	33.3	40.0
Carinthia	32.3	36.5
Total	73.2	2/ 74.2

1/ Excluding "rough grazings".

2/ The deviation from the corresponding OEEC-figure (table 48) is explained by the fact that in Austrian statistics total fertilizer consumption is related to an agricultural area of 2,817,000 hectares, while OEEC-computations are based on an area 2,841,000 hectares.

extent, the decrease of marginal returns can also be attributed to the spread of foot rot diseases (e.g., Cercosporella herpotrichoides, Ophiobolus graminis, Fusarium nivale, etc.), which are caused by the growth of monotype grain farming in the flat areas of Lower Austria. Furthermore, the stock of animals has decreased in these areas and accordingly, the production of manure. In addition, the content of organic matter in the soil has decreased due to the use of combine harvesters.When scythes or simple mowers, or binders were used, farms had a bigger volume of straw at their disposal, which returned organic material to the soil after it had been used for bedding animals.

In contrast to its effect on grain crops, fertilizer application to row crops (corn, potatoes, sugarbeets, and fodder beets) has caused yields to rise until recently. It is fairly certain, however, that in general the optimum point of efficiency of fertilization has been reached in the case of sugarbeets. Still higher average yields would probably involve increasing unit-cost. The yields of corn, potatoes, and forage (hay), on the other hand, could be raised even from an economic point of view through higher fertilizer application and in the case of corn by also using high-yielding varieties (e.g., hybrid corn). Since corn and potatoes ripen late and clover is utilized several times during the year, and grasses during a number of consecutive years, short periods of drought during the summer months have a comparatively small effect on yields.

In Austria, yields of some crops are still considerably lower than in the northwestern European countries with their highly developed agriculture. During the period 1957-59, average yields of wheat and potatoes were in the German Federal Republic 44 percent and 12 percent higher, and in the Netherlands 81 percent and 41 percent higher than in Austria

Table 50. – Fertilizer input and crop yields, 1936-1960, Austria 1/

Item	1936-38	1951-53	1954-56	1958-60
Fertilizer application (kg. pure nutrients per hectare of agricultural area)	10.5	31.9	42.0	71.5
Yields (quintals per hectare)				
Wheat	16.7	20.3	21.4	22.7
Rye	14.0	17.0	18.9	19.7
Barley	17.8	19.1	21.9	23.4
Oats	15.9	16.6	18.9	19.7
Corn	27.7	23.4	27.0	33.2
Sugarbeets	252.6	258.5	318.4	392.7
Fodder beets	293.1	312.1	346.0	405.4
Potatoes	144.1	154.7	167.8	194.4
Clover and clover-grass (hay)	53.9	48.5	59.4	63.9
Hay from meadows	39.1	34.7	41.8	43.9
Hay grown on arable land	46.0	41.1	51.4	52.9

1/ Calculations of the Institute based on data published by the Osterreichische Dungerberatungesstelle and the Austrian Central Statistical Office.

(table 51). Only the yields of sugarbeets, which in Austria are mostly grown on very efficient farms in fertile regions and with sufficient fertilizer application, were as high as in countries with a higher level of average fertilizer consumption.

The differences in yields per hectare can partly be explained by differences in soil quality, climate, and the distribution of farms by size classes. Especially in Belgium and the Netherlands, the quality of the soil is superior to that in Austria, and the intensity of its cultivation greater. Also, the number of livestock units per hectare is very high, due to ample purchases of compound feeds, so that a large quantity of manure is produced. Further, the total amount of rainfall is fairly equally distributed over the year and the distribution of farms by size groups is relatively favorable which facilitates technical training and assistance. Another advantage is the longer vegetation period for grain crops compared with that in regions with Pannonic climate in the eastern part of Austria.

To some extent, however, the lower yields in Austria can be attributed to the fact that the level of fertilizer consumption is still much lower than in the northwestern European countries. If yields in various European countries are compared with fertilizer input per hectare of total arable land, a close relation between these two sets of data is recognized, despite wide inter-country variation in other yield-influencing factors (variety, soil,

Table 51. – Fertilizer consumption and yields per hectare for selected crops in Western Europe, by individual country, 1957-59 1/

Country	Fertilizer consumption kg. per hectare 2/	Yields of quintals per hectare		
		Wheat	Potatoes	Sugarbeets
Belgium	203	37	221	361
Netherlands	202	39	263	413
Norway	137	21	201	-
German Federal Republic	148	31	222	377
Denmark	122	40	196	325
United Kingdom	84	33	185	293
France	66	23	143	296
Switzerland	67	32	265	446
Austria	66	22	198	384
Italy	43	19	93	330
Greece	33	16	117	-

1/ Calculation of the Institute based on OEEC ("Fertilizers") and FAO ("Production Yearbook") publications.

2/ Pure nutrients ($N + P_2O_5 + K_2O$) per hectare of agricultural area (excluding "rough grazings").

climate, etc.) and also in the distributions of fertilizer consumption among individual crops and between crops and grassland. As a general rule, countries with a high level of fertilizer consumption achieve high yields and vice versa. But the development of time series for various European countries proves the increasing effect of the law of diminishing returns, especially in countries with very high levels of fertilizer consumption. It has to be taken into account, however, that in recent years more fertilizer has been applied not solely to grain and row crops but often also to grassland. Thus, more hay was produced and the output of milk and meat could be increased. Since fertilizers were distributed over larger areas, fertilizer application to cash crops increased at a lower rate than total fertilizer consumption (table 52). For a more exact analysis of the efficiency of fertilization it would be necessary to calculate the volume of total crop production (in terms of grain equivalent) as well as average yields per hectare (area productivity), and to relate these figures to the total amount of fertilizer consumption.

1.3 The Influence of Price on Fertilizer Consumption

In Austria, phosphate and potash fertilizers as well as agricultural lime are subsidized out of the federal budget. The extent of price reduction varies among the different types of fertilizers; it amounts on the average to 53 percent for ground phosphate, 41 percent for basic slag, 29 percent for single superphosphate, and 18 percent to 20 percent for potassium chlorides and agricultural lime. Only nitrogenous fertilizers are sold at market prices. The amount of price subsidy rose from 96 million AS in 1955 to 123 million AS and 142 million AS in 1956 and 1957, and reached a peak in 1958 of 233 million AS. In 1959 and 1960, 223 mil. AS and 203 mil. AS were allocated for the price support program. In past years, smaller amounts for subsidy were needed in spite of increased imports, because market prices and transportation costs had declined.

The price ratios between the individual types of fertilizers have changed very little since 1937 due to the price subsidization for certain fertilizers. At present, nitrogenous fertilizers are sold at 4 to 4.4 times (according to the season) the prewar price. The price of phosphate fertilizers is 4.5 times, and that of potash fertilizers 4.1 times, higher than before the war. (Those results are shown in table 53). In total, fertilizer prices rose to a level 4.4 times higher than in 1937. In comparison, the index of prices paid by farmers increased by more than 8 times. Fertilizers, therefore, are among the cheapest means of production bought by agriculture. In the absence of price subsidization, prices of phosphate fertilizers (trade margins remaining constant) would have risen to 6.3 times (single superphosphate) to 8.4 times (basic slag), and those of potassium chlorides to 5 times the 1937 level. The price index for all fertilizers would rise to 5.6 times above 1937, or by 27 percent.

Other countries of western Europe also grant price subsidies for fertilizers, namely, Belgium, the German Federal Republic, Greece, Ireland, Luxemburg, the Netherlands, Norway, and Turkey. Only in the United Kingdom, Iceland, Sweden, and Switzerland are fertilizers sold at market prices. On the average, the prices of fertilizers are lowest in Austria. Nitrogenous fertilizers are somewhat more expensive than in Norway and the Federal Republic of Germany, but one third cheaper than in Belgium, France, Portugal, Spain, and Switzerland. The prices of phosphate fertilizer are especially low due to supports out of the federal budget. In Belgium and France phosphates are 13 percent and 15 percent more expensive than in Austria; in the United Kingdom and Italy they are 30 percent and 32 percent more expensive; and in the Netherlands and in Switzerland they are 41 percent and 64 percent more expensive. Austrian prices for potash fertilizers are 26 percent and 71 percent higher than in the German Federal Republic and in Spain (these countries have large deposits of crude potash salts), but 19 percent and 21 percent lower than in Belgium and France, and 26 percent, 44 percent, and 47 percent lower than in the Netherlands, Italy, and the United Kingdom.

Both the composition and in part the level of fertilizer consumption depend on the ratios of fertilizer prices. They have an indirect influence on the efficiency, the yield increments, and the returns of fertilization. This is the reason why in many countries fertilizer prices are controlled and certain types of fertilizers are subsidized. In Austria, the present price ratio of $N : P_2O_5 : K_2O$ is 100 : 51 : 31 ; there are similar ratios found in other countries, e.g. Belgium (100 : 45 : 26), France (100 : 60 : 40), and Sweden (100 : 60 : 31). In the absence of price subsidization the price ratio in Austria would be 100 : 84 : 37.

In 1959/60, the ratio of nutrients in Austrian fertilizer consumption was ($N : P_2O_5 : K_2O$) was 1 : 1.8 : 1.9. Experts have repeatedly recommended a similar ratio, because large scale soil analyses revealed a considerable deficiency of phosphate and in certain regions also of potash.

Table 52. – Growth rates for fertilizer consumption and yields per hectare for selected West European countries, 1951-1959 1/

Country	Percentage change from 1951-53 to 1954-56				Percentage change from 1954-56 to 1957-59			
	Fertilizer application	Yields			Fertilizer application	Yields		
		Wheat	Potatoes	Sugarbeets		Wheat	Potatoes	Sugarbeets
Belgium	+ 7	0	+ 14	+ 10	+ 8	+ 10	- 15	- 5
Norway	0	+ 12	+ 4	-	+ 15	- 4	- 3	-
German Federal Republic	+ 34	+ 16	+ 26	+ 13	+ 24	+ 5	- 12	+ 2
France	+ 32	+ 5	+ 8	+ 22	+ 57	+ 1	+ 18	+ 18

1/ Calculation of the Austrian Institute of Economic Research.

Table 53. – Index of fertilizer prices, by fertilizer type, 1961, Austria 1/

Item	(1937=100)				
	Nitramoncal (20.5% N)	Superphosphate (18% P_2O_5	Basic slag (16% P_2O_5	Potassium chlorides (40% KO)	Total 2/
Including price subsidy (January 1961)	430	446	475	406	439
Excluding price subsidy	430	632	835	496	558

1/ Calculation of the Institute.
2/ Weighted average (weights: nitramoncal 50, superphosphate 15, basic slag 22, potassium chlorides 13).

A rise in the prices of phosphate and potash fertilizers most probably would reduce total fertilizer consumption whereby the decrease of phosphate and potash fertilizer consumption would be larger than that of nitrogenous fertilizers. This was shown by the development in 1952/53. From mid-1952 to May 1953, practically no subsidies for imported fertilizers were granted. Prices for nitrogenous fertilizers remained unchanged but phosphate and potash fertilizer prices increased by more than 60 percent. Total consumption decreased by one fourth; consumption of nitrogenous fertilizers dropped by 16 percent, phosphate consumption by 34 percent, and consumption of potash fertilizers by 26 percent. The ratio of nutrients ($N:P_2O_5:K_2O$)shifted from 1 : 1.4 : 1.4 to 1 : 1.1 : 1.2. This response caused the Ministry of Agriculture and Forestry to reestablish price subsidies for imported fertilizers in mid-May 1953. As long as world market prices for crude phosphates and phosphate fertilizers remain high, price subsidies for fertilizers in Austria can be assumed to continue.

The low level of Austrian fertilizer prices has stimulated consumption greatly. According to economic theory, the optimum level of fertilizer input is reached when the cost of a further fertilizer unit added is as high as the value of the corresponding yield increment, i.e., when marginal cost equals marginal return. If all other environmental growth factors and the prices of agricultural produce are assumed constant, the optimum level of fertilizer application is higher when fertilizer prices are low and vice versa.

Apart from the favorable price situation for fertilizers, continuing organizational and technical improvement and efficiency have increased the profitability of fertilization. The economic limit of fertilizer application was pushed upwards by measures which increased the efficiency of each factor of production. The optimum level of fertilization is much higher, for example, if the agricultural area is predominantly used as arable land and many row crops and high-yielding varieties of other species are grown. It is lower, on the other hand, if grassland is prevailing. A number of other measures have moved up the economic limit of fertilization, and have increased productivity, e.g., irrigation and drainage, consolidation of scattered holdings, and the use of machinery(deeper ploughing).

In recent years, fertilizer consumption was stimulated also by special credit programs. Dealers and cooperatives grant credits at low interest for fertilizer purchases. The repayment is made in fall and winter, mostly through deliveries of agricultural produce.

A further factor determining the level of fertilizer consumption is technical knowledge. Large farms which are operated mostly by well-trained personnel and farmers who have attended vocational schools generally use more fertilizer than small and middle-sized farms. The intensity of fertilization is still very unequally distributed in Austria, even within the same community in spite of equal natural conditions. Technical knowledge of farmers will increase considerably in the future, however, because in most provinces compulsory attendance at agricultural schools has been introduced recently, and a number of new higher agricultural schools has been established.

1.4 Projected fertilizer consumption and yields per hectare until 1975

In Austrian agriculture, a continuing increase in fertilizer consumption can be assumed. Phosphate and potash fertilizers will probably continue to be sold at subsidized prices. In most cases, the economic optimum of fertilization has not yet been reached and this optimum level is continuously shifted upwards through organizational and technological measures. The increase in consumption will be limited, however, and the rate of increase will slow down. With the same level of fertilizer consumption as in the northwestern European countries, Austria cannot achieve equally high yields because of its poorer soil quality and its more extreme climatic conditions with low temperatures in the mountain areas and droughts in the flat eastern areas. The comparative cost advantages in Austria (lower fertilizer prices and partly higher product prices) do not fully offset these disadvantages. Table 54 shows the level of fertilizer consumption in 1959/60 and projections for 1965 and 1975. It can be assumed that in Austria the index of fertilizer consumption will rise to 900 until 1965 and to 1,300 until 1975 (1936/37 = 100). This corresponds to annual growth rates of 5.74 percent for the period 1960-65, and to 3.75 percent for the period 1965-75. These estimates take into account the development of fertilizer consumption since 1951/52 as well as the lower growth rates in recent years. The extrapolation of fertilizer consumption has been demonstrated graphically.

The volume of consumption of 900 in 1965 (1936/37 = 100) corresponds to a total of 276,000 tons of pure plant nutrients (32 percent over 1960). Based on the ratio of nutrients in 1959/60, total consumption will be composed of 59,000 tons of N, 106,000 tons of P_2O_5, and 111,000 tons of K_2O. Similar computations for 1975 yield a total consumption of 399,000 tons of pure nutrients (a 91 percent increase over 1960, and 45 percent higher than in 1965). The quantities of the individual nutrients may amount to 86,000 tons of N, 153,000 tons of P_2O_5, and 160,000 tons of K_2O. It is further assumed that the agricultural land area will be reduced (due to reforestation and the increase of building sites) from 2.84 million hectares to 2.80 million hectares by 1965 and to 2.72 million hectares by 1975. Fertilizer input per hectare will rise to 99 kilograms pure nutrient material in 1965 and to 147 kilograms in 1975. The level of consumption in 1965 would then be slightly below the present level in the United Kingdom; it still would be in 1975 below the present level in Germany but already higher than in Norway.

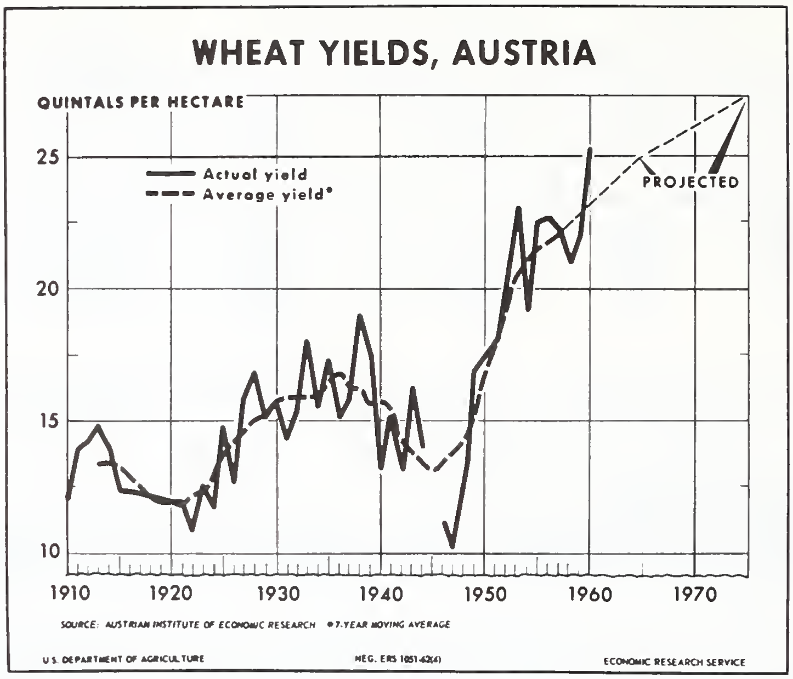
Table 54. - Fertilizer consumption by type, 1959/60 and projections to 1974/75, Austria 1/

Year	In 1,000 tons of pure nutrients				Index (1936/37 = 100) 2/	Consumption in kg. per hectare of agricultural area 3/
	N	P_2O_5	K_2O	Total		
1959/60	45	80	84	209	681	74
1964/65	59	106	111	276	900	4/ 99
1974/75	86	153	160	399	1,300	4/147

1/ Projections based on the trend in the most recent years and the pattern of consumption in 1959/60.
2/ Quantity index at constant prices (1937).
3/ Excluding "rough grazings".
4/ For 1965 and 1975, total agricultural area was assumed to be 2.80 million hectares and 2.72 million hectares respectively, i. e., 41,000 hectares and 121,000 hectares less than in 1960.

An increase in fertilizer consumption will result in higher yields per hectare. To estimate the future development of yields, the time-series since 1910 were smoothed by computing moving averages (n = 7). The yield curve for grain crops was flattening from 1954-55 onward, in spite of the very high yields in 1960. This excluded a linear extrapolation of the data since 1950. Applying this method, future yields would have been overestimated. So the part of the curve covering the most recent years was graphically continued whereby allowance was made for the specific production conditions of individual crops (figures 4-14). The estimate of average yields per hectare in 1965 (because of changing weather conditions these projections actually are averages for the period 1962-68) partly takes account of the excellent crop expectations for 1961. The yields per hectare of most grain crops will presumably be even higher in 1961 than in the top year 1960. This means that in the adjusted time series the values for 1958 will also rise. For the period 1965-75, a further slight decrease of the growth rate was assumed according to the projections of fertilizer consumption.

Yields per hectare for Austria in the past, and projections for 1965 and 1975 are presented in Table 55. The estimated yields in 1965 of wheat, barley, oats, corn, and sugarbeets are about the same as the top yields in 1960. The projected yields of rye, potatoes, clover, and hay from meadows will exceed the results of 1960. The grain crop yields are from 12 percent (oats) to 24 percent (barley) higher than the values of 1957 which had been adjusted for random fluctuations. The row crop yields are from 14 percent (fodder beets) to 23 percent (corn, potatoes), and the hay yields from 14 percent (grass grown on arable land) to 23 percent (clover) higher than in 1957. The annual average growth rates of yields per hectare in the period from 1957 (moving average 1954-60) to 1965 are 1.42 to 2.66 percent for grain crops, 1.65 to 2.61 percent for row crops, and 1.68 to 2.60 percent for feed crops.



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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Figure 4

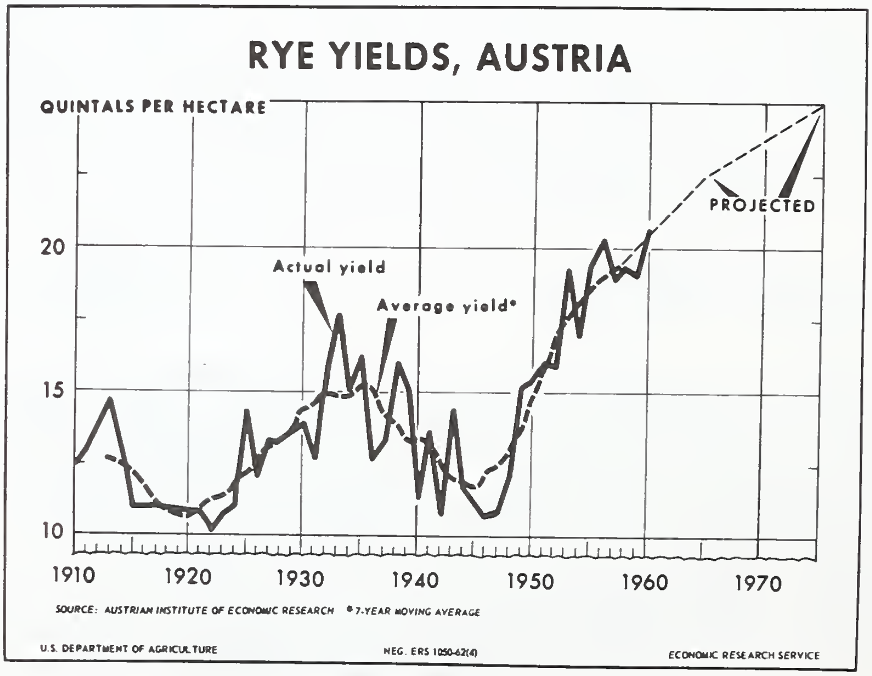

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Figure 5

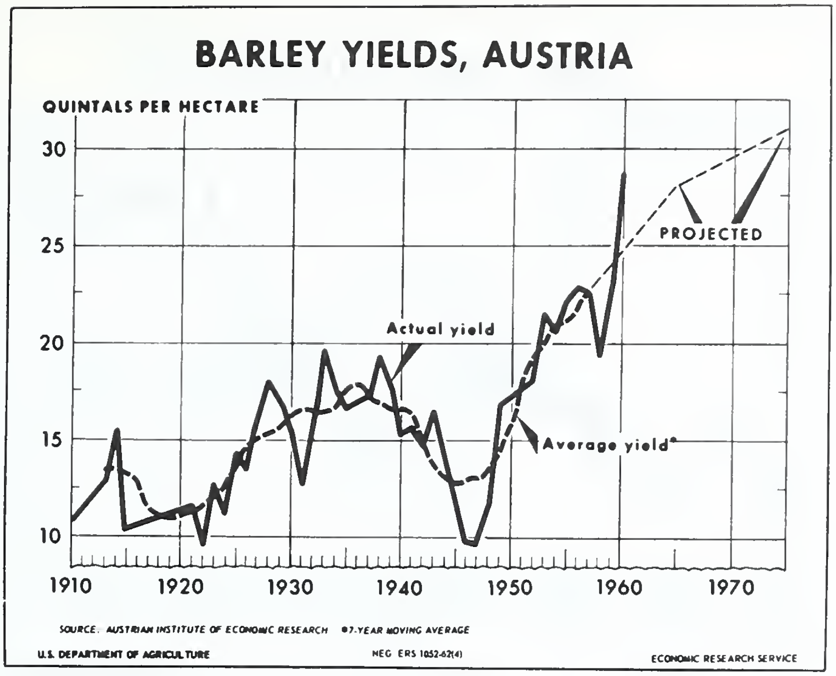

Figure 6

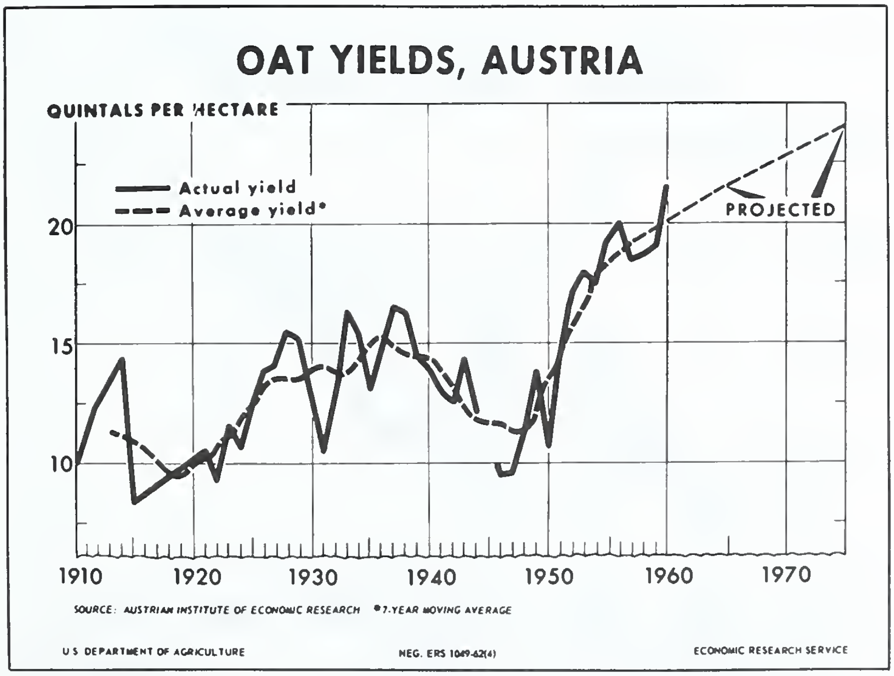

Figure 7

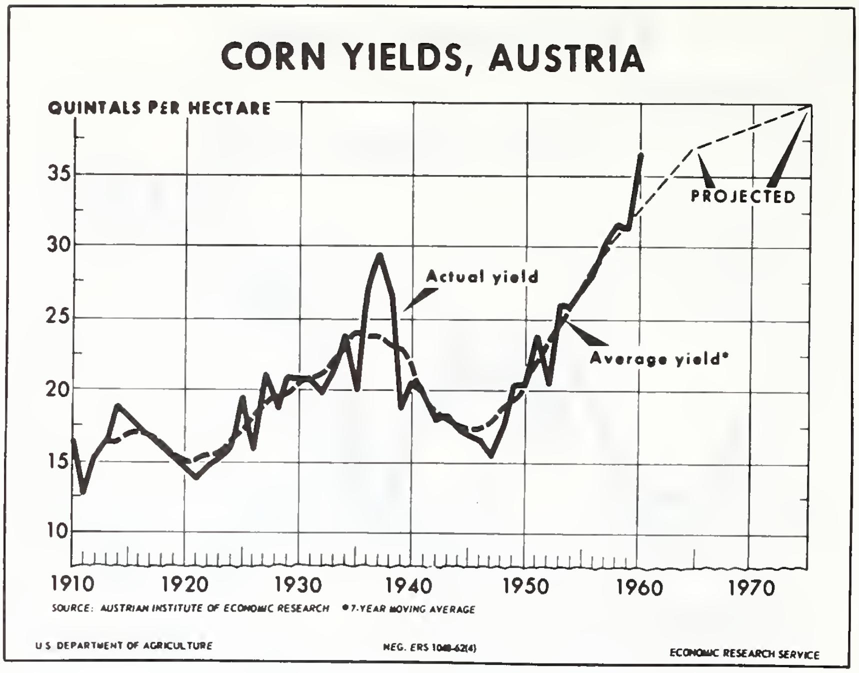

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Figure 8

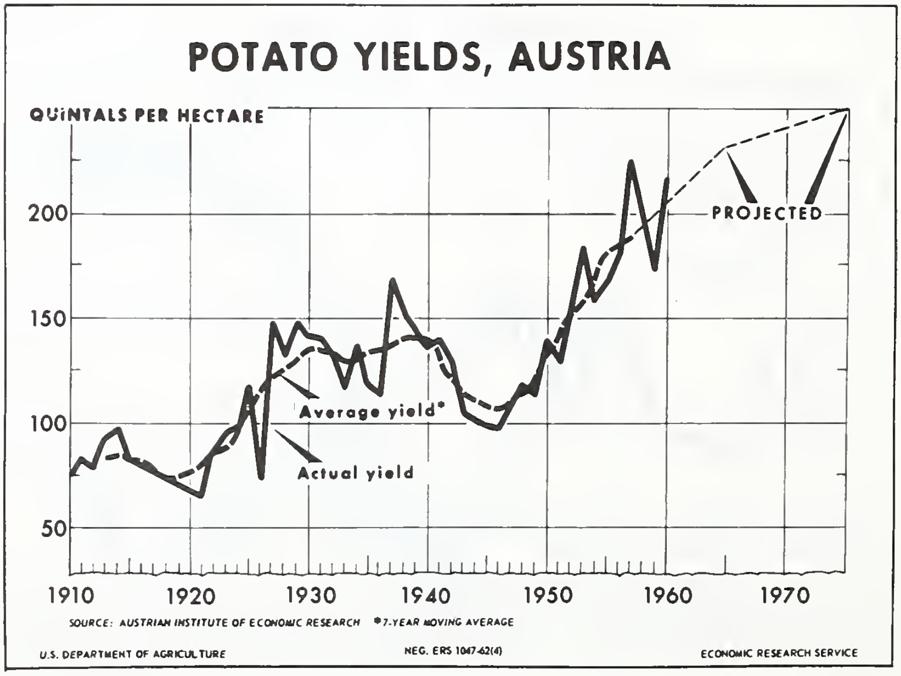

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Figure 9

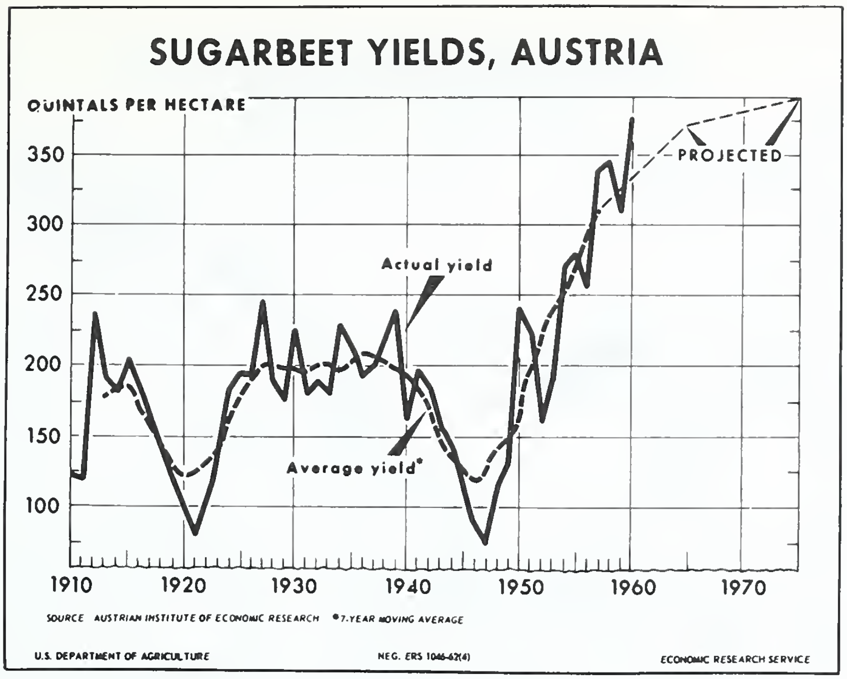

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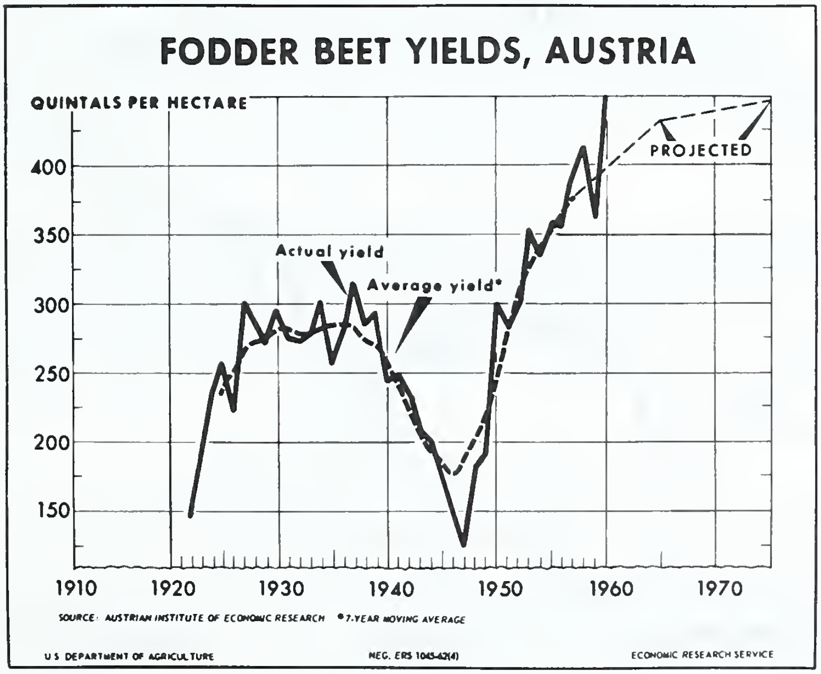
Figure 10



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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Figure 11

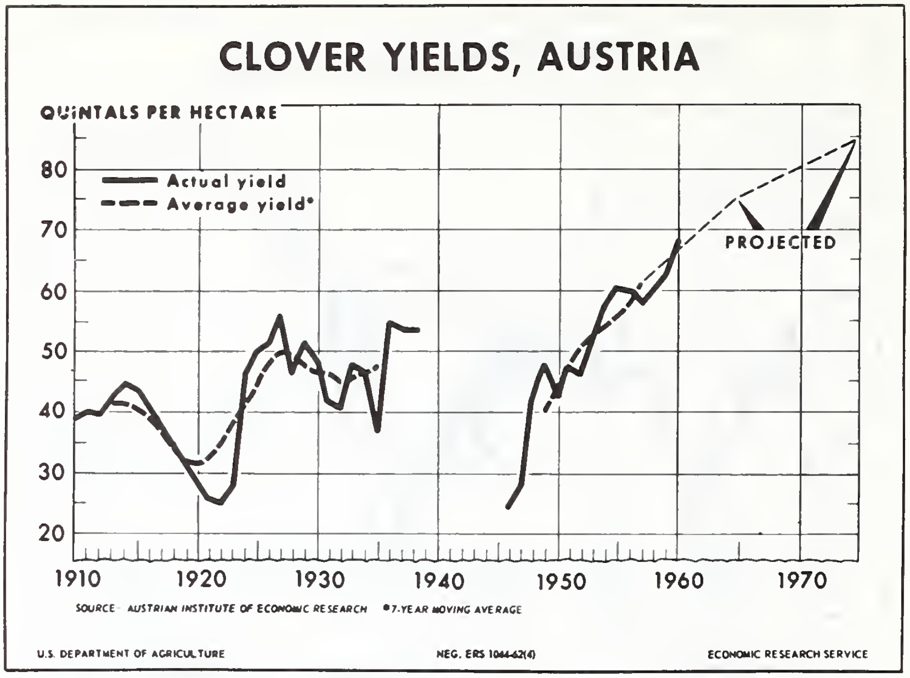

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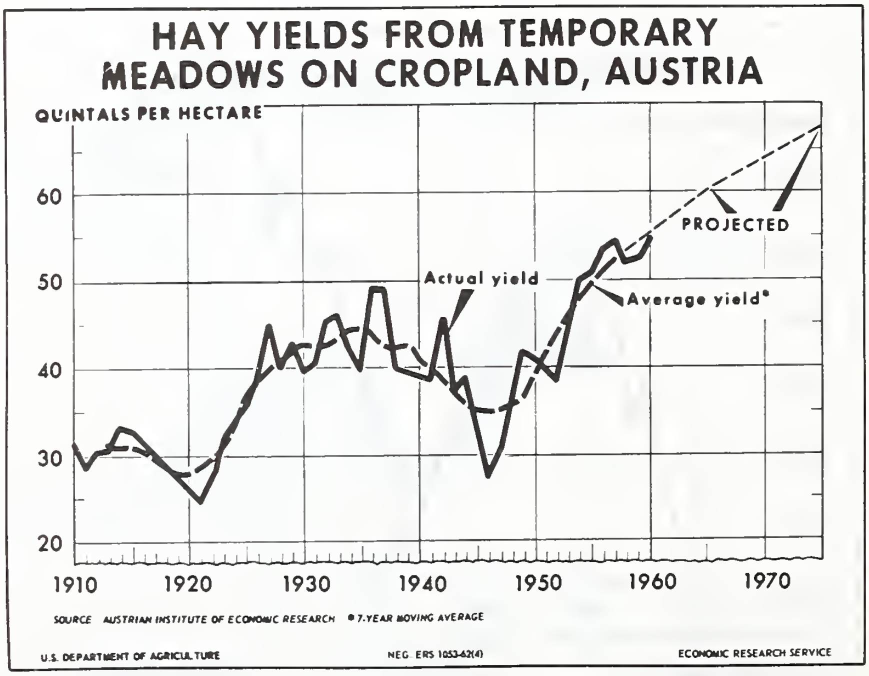
Figure 12



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1053-62(4) ECONOMIC RESEARCH SERVICE

Figure 13

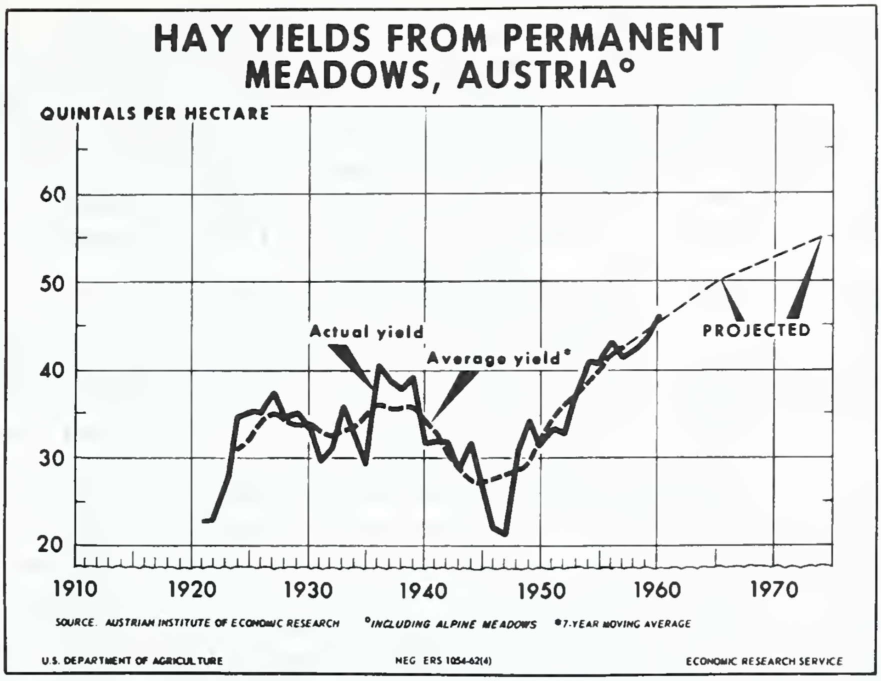


Figure 14

Yields per hectare will continue to rise until 1975, but due to the law of diminishing returns, the growth rates will be lower than in the preceding decade. The annual growth of yields is estimated at 0.96 to 1.11 percent for grains, at 0.46 to 0.84 percent for row crops, and at 0.96 to 1.26 percent for fodder crops. A smaller increase in the yields of row crops is estimated, because the optimum will presumably be reached by 1965, owing to intensive fertilization.

By 1965, the yields of wheat will be already one tenth higher than the average 1957-1959 yield in France, but one fifth below the yields in the German Federal Republic. By 1975, wheat yields still will be one eighth smaller than the 1957-59 average in Germany, and 30 percent lower than in Belgium, the Netherlands, and in Denmark. The yields of potatoes and sugarbeets in 1965 and 1975, on the other hand, will be only slightly below the record yields in Western Europe in 1957-59.

2. Projected Production Areas

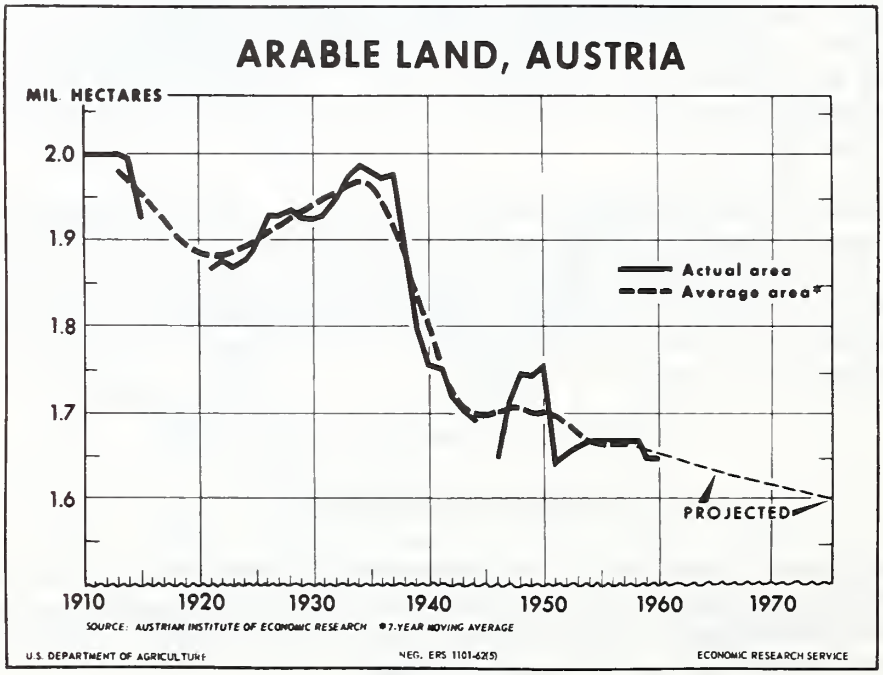
2.1 Pattern of land use

Of the total land area of Austria (8.3 million hectares), three fourths are alpine regions, or regions climatically influenced by the Alps. In these areas, grassland farming and animal husbandry are predominant. In the eastern parts of the country, where climatic conditions are more favorable, grain farming prevails.

In the past decades, forest land has increased at the cost of arable land as well as of alpine and other pastures. At the present time, arable land (including gardens) accounts for about 21 percent of the total land area; 26 percent is natural grassland, 40 percent is woodland, and 13 percent involves unproductive areas. In 1934-38, arable land was more than 300,000 hectares (19 percent) larger than it is at present and alpine and other pastures were more than 100,000 hectares (9 percent) larger than in 1960. On the other hand, forest land was in 1934–38 225,000 hectares (7 percent) smaller and unproductive areas amounted to 120,000 hectares (12 percent) smaller than in 1960. The shifts in the pattern of land use were caused by industrialization, the establishment of military training areas after 1938, and the reforestation of marginal areas which are very distant from the market.

Taking into account the results of the Forest Census of 1952-56, the agricultural area (arable land, gardens, meadows, and pastures) can be estimated at about 3.9 million hectares. According to the Central Statistical Office, the agricultural area is larger. The difference between their estimate of 4.1 million hectares and the one given above is due to the overestimation of the grassland area. For more on this point Section I of Chapter VI.

Less than one fourth of the agricultural area is used for the production of crops for human consumption, which means that on more than three-fourths feed crops are grown. The areas of arable land and of grassland probably will continue to decrease. On the basis of developing trends in the past years, arable land can be assumed to decline to 1.63 million hectares by 1965 and to 1.60 million hectares by 1975, compared with 1.65 million hectares in 1960 (table 56). The alpine grassland area, which amounted to 965,000 hectares in 1960, will decrease by about 5,000 hectares annually because of reforestation and the increase of building areas. 23/ It will be reduced to 940,000 hectares by 1965 and to 890,000 hectares by 1975 (figure 15).



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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Figure 15

23/ This area was estimated as 1,095,000 hectares by the Central Statistical Office.

Table 55.—Crop yields in quintals per hectare, 1934-1960, and projections for 1965 and 1975, Austria

Crop	1934-38	1957*	1958	1959	1960	PROJECTIONS			
						1965*		1975*	
						Crop yield	Index of yield (1957*=100)	Crop yield	Index of yield (1965*=100)
Wheat	16.7	22.1	20.9	22.0	25.3	25.0	113.1	27.5	110.0
Rye	14.7	19.3	19.3	19.1	20.7	22.5	116.6	25.0	111.1
Barley	17.6	22.7	19.4	22.7	28.1	28.0	123.3	31.0	110.7
Oats	15.2	19.2	18.7	19.1	21.3	21.5	112.0	24.0	111.6
Corn	25.5	30.1	31.6	31.4	36.5	37.0	122.9	40.0	108.1
Potatoes	137.6	187.2	199.3	172.3	211.5	230.0	122.9	250.0	108.7
Sugarbeets	262.3	360.2	394.2	359.0	425.0	420.0	116.6	440.0	104.8
Fodder beets	287.2	377.1	412.4	366.7	437.2	430.0	114.0	450.0	104.1
Clover (hay)	49.0	61.1	60.0	62.7	68.9	75.0	122.7	85.0	113.3
Hay grown on arable land	44.1	52.5	51.9	52.3	54.4	60.0	114.3	67.5	112.5
Hay from meadows 1/	35.8	42.6	42.2	43.5	46.1	50.0	117.4	55.0	110.0

* Estimated from 7-year moving averages.

13/ Including hay from alpine meadows, but excluding extensively used meadows (Streuwiesen).

On the average over many years, about half of the arable land was used for grain crop production. This is illustrated in table 57 which shows distribution of arable land by crop types. Over one-fifth was under row crops, and one-eighth under clover and clovergrass. The remaining area was used alternately as arable land, grassland, or was under "other crops." The crop production pattern on arable land will change but little in the future. The movement of labor out of agriculture will induce organizational improvements and stimulate the extension of grain crop farming because of its easy mechanization. Biological laws, however, require a crop rotation scheme based on the alternating cultivation of "stalk" and "leaf" crops, since continued monotype farming spreads foot rot diseases causing soil deterioration and a decrease in yields. On the basis of the individual projections, which will be elaborated later in this section, it is expected that the proportion of grain crops in total arable land will increase slightly from 49 percent in the period 1954-60 (1957) to 51 percent in 1965, and to 53 percent in 1975. 24/ The proportion of row crops will be 21 percent, thus remaining almost unchanged (1957*: 20 percent), and that of clover will decrease from 15 percent in 1957* to 13 percent in 1965, and to 10 percent in 1975.

2.2 Past and projected development of crop areas

Similar to the method adopted for projecting yields per hectare the estimates of crop production areas in 1965 and 1975 were derived by graphical extrapolation of historical trends. For this purpose, the time series up to 1960 were adjusted for random fluctuations by means of moving averages (n = 7), and the trend prevailing in the past years – which, in general, is not linear but a flattening curve – has been extended to the target years. This kind of projection was justified by the fact that generally the trends of recent years are in close agreement with the tendencies over longer periods (from 1910 on). The results so obtained were then modified in the light of various considerations. Technical factors (e.g., the spread of foot rot diseases due to continued grain farming) as well as economic influences and the effects of agricultural policy measures (e.g., establishment of sugarbeet quota, different price levels for soft and hard wheat) were taken into account insofar as these factors were in effect when the study was made. Allowance has not yet been made for possible future shifts in the pattern of production which may result from divergent development trends of production and demand.

Grain crops. In the past decades, considerable changes have occurred in the pattern of grain crop production. Apart from short-term fluctuations during both world wars and the periods immediately afterwards, wheat and barley areas have shown a rising tendency, whereas areas under rye and oats have decreased (table 58). From 1934-38 to 1957* (average 1954-60), the land under wheat and barley increased by 3 percent and 6 percent, while rye and oat areas decreased by 44 percent and 38 percent, respectively. The following factors were primarily responsible for this development:

(a) the price advantage of wheat and industrial barley over rye and oats;

(b) the declining consumption of rye bread;

(c) the easy harvesting process of short-stalked and lodging-resistant wheat varieties by the use of combines;

24/ The 7-year moving average 1954-60 corresponds to the value for 1957 adjusted for random fluctuations (it will be marked (1957*" in the following).

(d) the decrease in horses and the subsequent decrease in demand for oats;

(e) the rising demand for barley for industrial uses as in increased beer production, and also for feeding due to more intensive hog and poultry raising; and

(f) the greater efficiency of wheat and barley production on soils of rather inferior quality due to increased fertilization and the development of varieties which are adapted to less favorable conditions.

Table 56. —Agricultural land, by type of use, specified years and projections for 1965 and 1975, Austria

Year or period	Arable land	Gardens 1/	Meadows 2/	Pastures 3/	Total agricultural area
			1,000 hectares		
1910	1,999	132	925	1,309	4,364
1921	1,868	108	1,033	1,332	4,358
1934-38	1,961	133	949	1,285	4,344
1957*	1,668	102	1,099	1,184	4,073
1958	1,668	102	1,100	1,186	4,081
1959	1,647	107	1,094	1,179	4,052
1960	1,647	107	1,095	1,179	4,052
1960 4/	1,647	-	965	-	3,923
1965*	1,630	-	940	-	-
1975*	1,600	-	890	-	-

1/ Including vineyards, land under crop trees, and nurseries.
2/ Including alpine meadows for hay production, but excluding extensively used non-alpine meadows ("Streuwiesen").
3/ Including alpine pastures and non-alpine rough grazings, but excluding alpine meadows for hay production.
4/ Estimate of the Institute on the basis of the 1952-56 forest census figures.

Source: Austrian Central Statistical Office.
* 7-year moving average.

The shifts in the pattern of grain crop production are expected to continue, but at a slower rate than in the past. There are economic and technical limits, however, for the increase of wheat production. In years of average crop yields, the production of soft wheat is only a little below the volume of domestic demand, and in years of favorable growth conditions, there is a surplus. Because of the high level of grain prices in Austria, surplus crops can be exported only with great difficulty. In order to adjust production to domestic demand, in 1961 producer's prices for soft wheat were lowered and those for quality wheat (which still has to be partly imported) were raised. 25/ Also, the spread of foot rot diseases was instrumental in keeping wheat production within reasonable

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25/ The details of Austrian agricultural policy were discussed in Section 3 of Chapter III.

Table 57. – Percent of arable land by major crop type, Austria specified years, 1910-1960, projections for 1965 and 1975

Year or period	Grain crops 1/	Row crops 2/	Clover	Hay 3/	Other crops
1910	60	-	10	6	-
1922	50	16	11	7	16
1934-38	54	20	13	6	7
1957*	49	20	15	9	7
1958	49	20	15	9	7
1959	50	20	14	9	7
1960	50	21	13	9	7
1965*	51	21	13	9	6
1975*	53	21	10	10	6

Source: Austrian Central Statistical Office

1/ Wheat, rye, barley, oats.
2/ Corn, potatoes, sugarbeets, fodder beets.
3/ Areas used alternately as arable land and as grassland.

* 7-year moving average.

limits. Until 1965 the wheat area will, therefore, presumably not rise at the same rate as it did in the past years, and its increase from 1965 to 1975 will be very moderate. The rye area will decline until 1965 by about the same annual amount as in recent years. Later, the rate of decrease will be smaller because there are large regions in Austria where natural conditions do not permit the cultivation of all grain crops, just that of rye and oats. Also, an eventual association with the EEC would not reduce rye production considerably, especially if crop premiums are granted which compensate for the price differential between coarse grains and bread grains. According to the estimates of the Institute, production areas of wheat will increase by 17 percent and that of barley will increase by 22 percent until 1965, as compared with the areas harvested in 1957* which have been adjusted for random fluctuations. From 1965 to 1975, there will be further increases of 7 percent and 18 percent, respectively. At the same time, the areas under rye and oats will decrease respectively by 22 percent and 20 percent until 1965, and by a further 4 percent and 30 percent from 1965 to 1975 (figures 16 to 19).

The proportion of wheat in the total grain crop area (excluding corn) amounted to 20 percent in 1910, 23 percent in 1934-38, and 25 percent in 1957*. The share of rye amounted to 37 percent in 1910, 34 percent in 1934-38, and 25 percent in 1957*; that of oats 14 percent, 27 percent, and 22 percent, respectively, in the three periods just mentioned. According to the projections, the share of the area under wheat will rise to 36 percent by 1965 and to 38 percent by 1975; that under barley will increase to 25 percent and 29 percent for the two periods, respectively. The relative area under rye will decline to 22 percent and 21 percent, and that under oats to 17 percent and 12 percent, respectively.

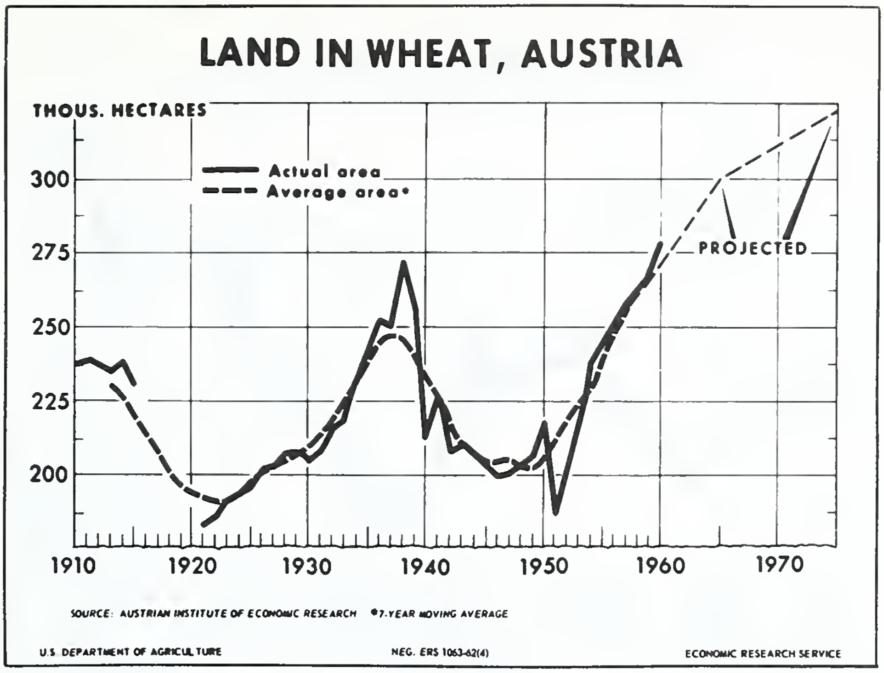

Figure 16

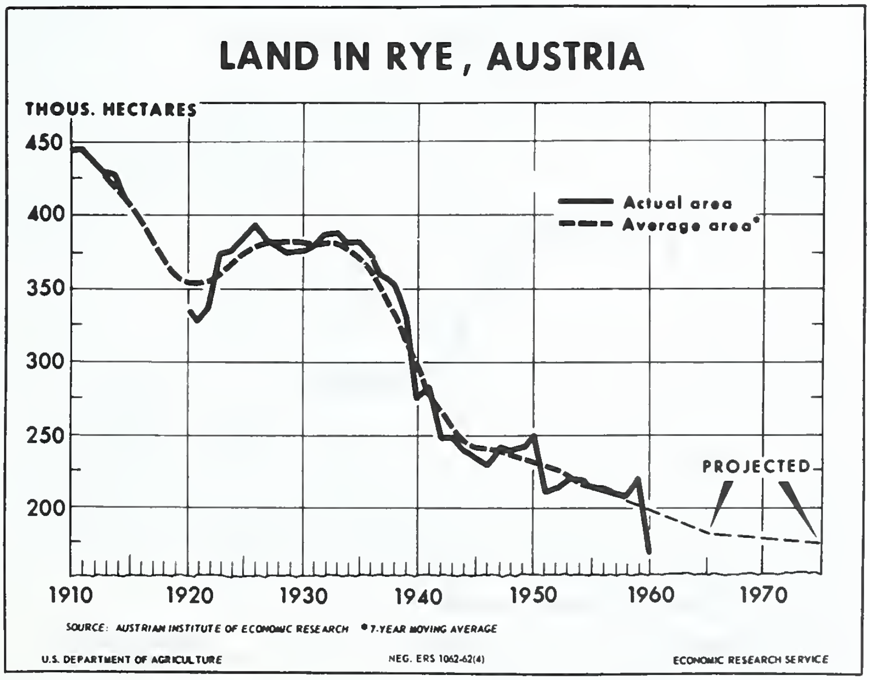

Figure 17

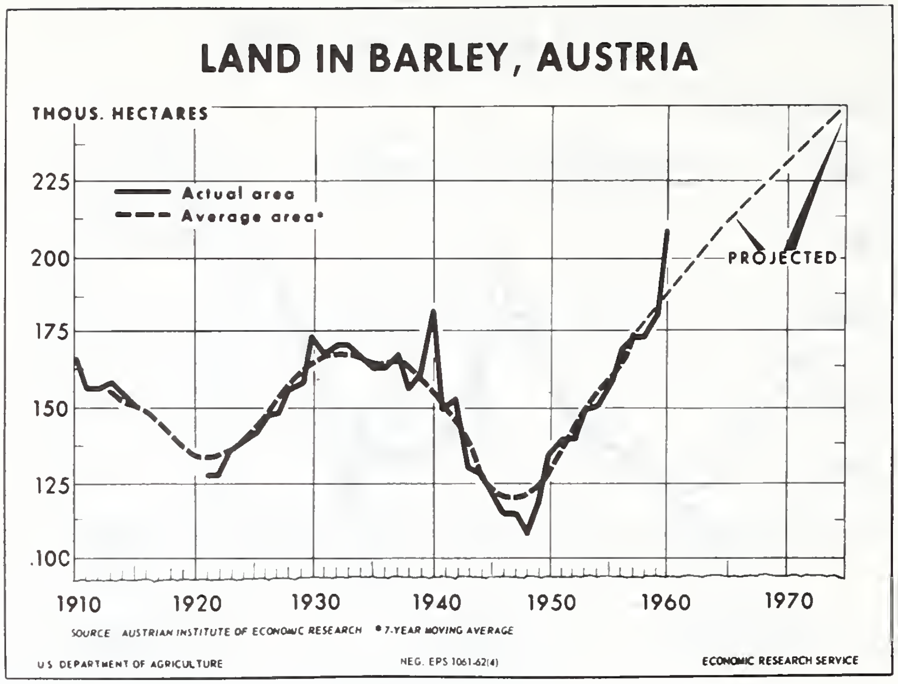

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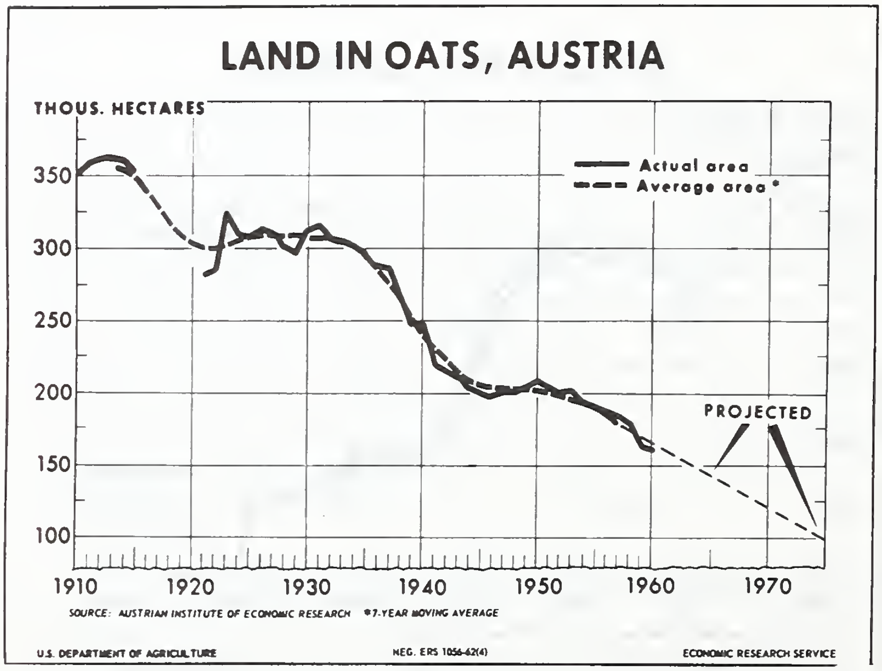
Figure 18



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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Figure 19

Table 58. – Distribution of land in grains by type of grain grown, 1910-1960, and projections for 1965 and 1975, Austria

Year or period	Share of individual crops in total grain area							
	Wheat		Rye		Barley		Oats	
	1,000 hectares	Percent of grain area	1,000 hectares	Percent of grain area	1,000 hectares	Percent of grain area	1,000 hectares	Percent of grain area
1910	239	20	444	37	168	14	351	29
1921	183	20	327	35	128	14	282	31
1934-38	250	23	367	34	163	16	289	27
1957*	257	32	207	25	173	21	179	22
1958	263	32	206	25	173	21	178	22
1959	268	32	218	26	179	22	163	20
1960	277	34	171	21	209	25	161	20
1965*	1/ 300	36	182	22	211	25	143	17
1975*	1/ 320	38	175	21	249	29	100	12
	Index of grain area							
1965 as percent of 1957*	117	-	78	-	122	-	80	-
1975 as percent of 1965*	107	-	96	-	118	-	70	-

1/ The estimates take into account the limited market outlet.

* 7-year moving average.

Source: Austrian Central Statistical Office.

Table 59. – Distribution of land in row crops by individual crops, specified years and projections for 1965 and 1975, Austria

Year or period	Share of individual crops in total row crop area							
	Corn		Potatoes		Sugarbeets		Fodder beets	
	1,000 hectares	Percent of row crop area	1,000 hectares	Percent of row crop area	1,000 hectares	Percent of row crop area	1,000 hectares	Percent of row crop area
1910	63	-	165	-	20	-	-	-
1921	59	21	142	51	11	4	65	24
1934-38	66	17	207	53	43	11	72	19
1957*	53	15	178	52	46	14	63	19
1958	49	14	178	53	51	15	59	18
1959	46	14	171	52	54	16	57	18
1960	58	17	180	53	45	13	59	17
1965*	58	18	178	53	1/ 48	14	50	15
1975*	65	19	178	53	1/ 50	15	42	13
	Index of row crop areas							
1965 (1957*=100)	109		100		104		79	
1975 (1965=100)	112		100		104		84	

1/ The estimates take into account the imposition of quotas.

Source: Austrian Central Statistical Office.

* Estimate for 1957, 1965, and 1975 obtained as extrapolated 7-year moving average, centered.

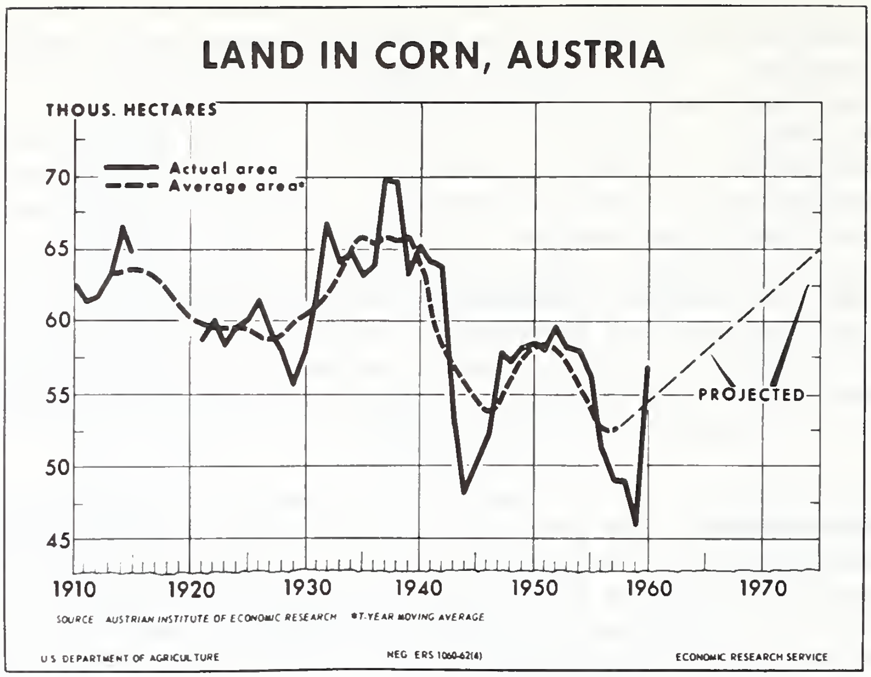
Row crops. The production areas of some row crops have fluctuated in the past decades. This is illustrated in table 59 which shows the distribution of individual row crops in the total row crop area. Corn is classified as a grain crop as well as a row crop; for operational and technical reasons, in this investigation corn is considered a row crop. In contrast to grain crops, no clear-cut trends valid for longer periods can be distinguished. Corn can only be cultivated in the warmer climate of the vine-growing regions. Also, sugarbeet cultivation is mainly concentrated in some flat or hilly parts of Lower Austria, Burgenland, and Upper Austria. From 1921 to 1957*, the share of corn in the total area under row crops (corn, potatoes, sugarbeets, and fodder beets) was only between 15 and 21 percent, and that of sugarbeets varied between 4 and 14 percent. The proportion of fodder beet area was 19 percent to 24 percent, and that under potatoes (which are grown almost everywhere in Austria) ranged from 51 percent to 53 percent. During the thirties, there was an especially large volume of potato production; the area under fodder beets was largest from 1947 to 1950.

As in the case of bread grains, the trend of past years in corn and sugarbeet areas could not be simply extended. The projection for corn had to take into account progress made in developing high-yielding varieties (hybrid corn). These new varieties have been adapted to the special conditions in Austria, and can only be gradually spread. Further, production areas can only be extended at a low rate because of the large investments which are necessary for mechanized harvesting and for the construction of drying units. Quotas for sugarbeet deliveries were introduced in 1960 after sugar production outstripped demand, and since that time growers and the sugar industry have agreed not to export sugar (because of low world market prices) except in years of unexpectedly large crops.

According to the estimates presented in this report, in 1965 the areas under corn and sugarbeets will be 9 percent and 4 percent larger than the average for the period 1954-60. The potato area, on the other hand, will remain unchanged, and the area under fodder beets will decrease about 21 percent. The projections for 1975 are based on the same propositions as those for 1965, but it was assumed that the changes in production areas (with the exception of corn) will be smaller. From 1965 to 1975, the areas under corn and sugarbeets will increase 12 percent and 4 percent, respectively, that under potatoes will remain constant, and the fodder beet area will decrease by 16 percent (figures 20 to 23).

Forage and other crops. The area under clover increased from about 200,000 hectares at the beginning of the twenties to 290,000 hectares in 1949, then decreased again to 242,000 hectares in 1957*, and to 219,000 hectares in 1960 (table 60). In 1965 and 1975, the expected area will cover 205,000 hectares and 166,000 hectares (clover and clover-grass), respectively. This decrease will be caused by the reduction of cattle and horse numbers in the eastern parts of Austria. Furthermore, since clover is sown into grain crops in spring, the plants are somewhat damaged when the grains are harvested with combines. The area used alternately as arable land and grassland is expected to change little; it is estimated at 150,000 hectares in 1965, and at 155,000 hectares in 1975, compared to 148,000 hectares in 1957* (figures 24 and 25).

Various other crops were grown in 1957* on 116,000 hectares of arable land; 15,000 hectares under mixed grains, 8,000 hectares under vegetables, 29,000 hectares under corn for silage or for green fodder, and 14,000 hectares under fodder mixed with vetch. These areas are estimated to total 105,000 hectares in 1965, and 100,000 hectares in 1975.



SOURCE AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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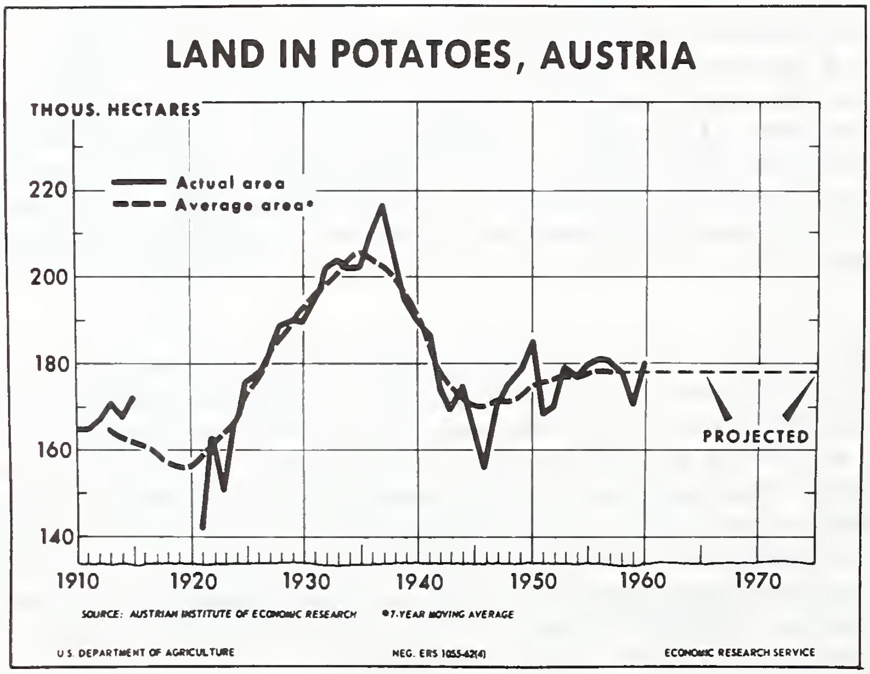
Figure 20



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

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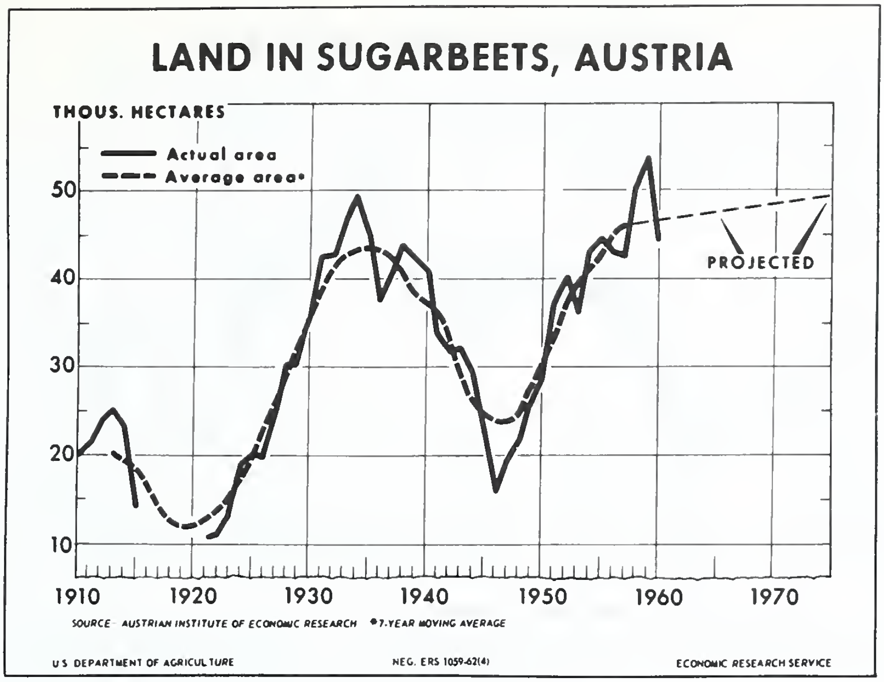
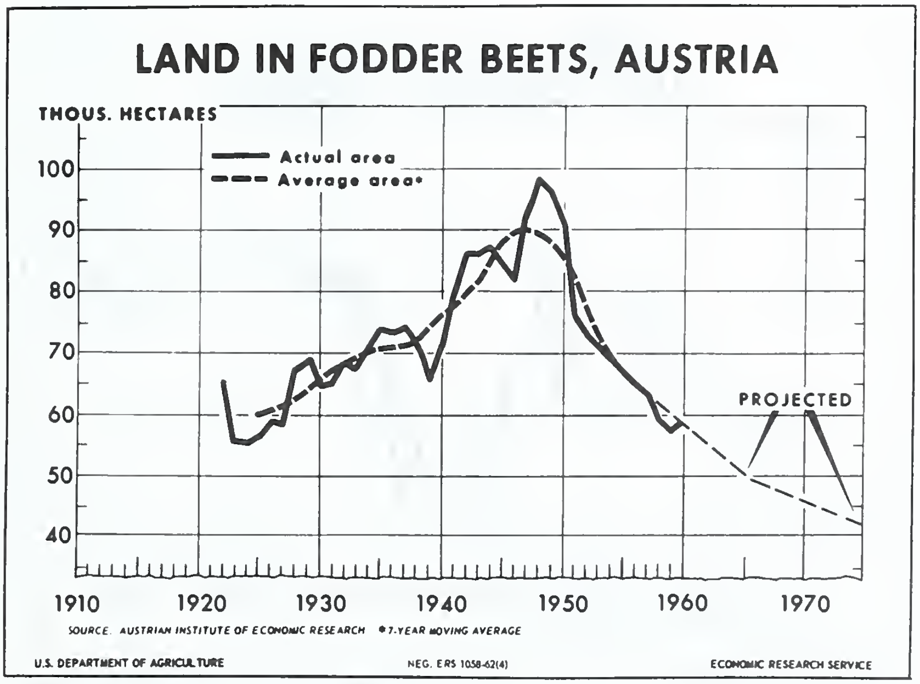
Figure 21


LAND IN SUGARBEETS, AUSTRIA

SOURCE AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1059-62(4) ECONOMIC RESEARCH SERVICE

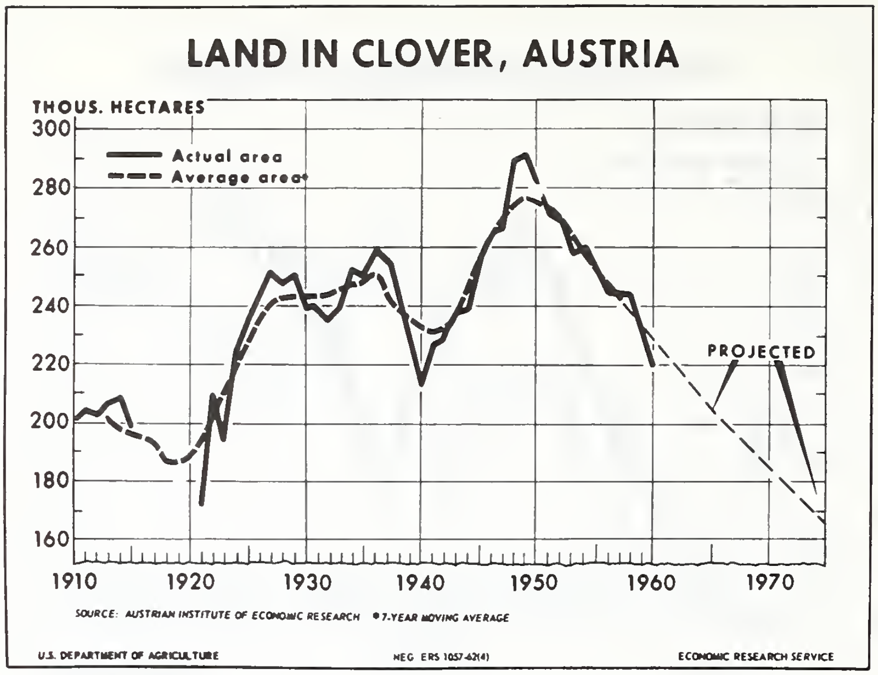
Figure 22


LAND IN FODDER BEETS, AUSTRIA

SOURCE. AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1058-62(4) ECONOMIC RESEARCH SERVICE

Figure 23

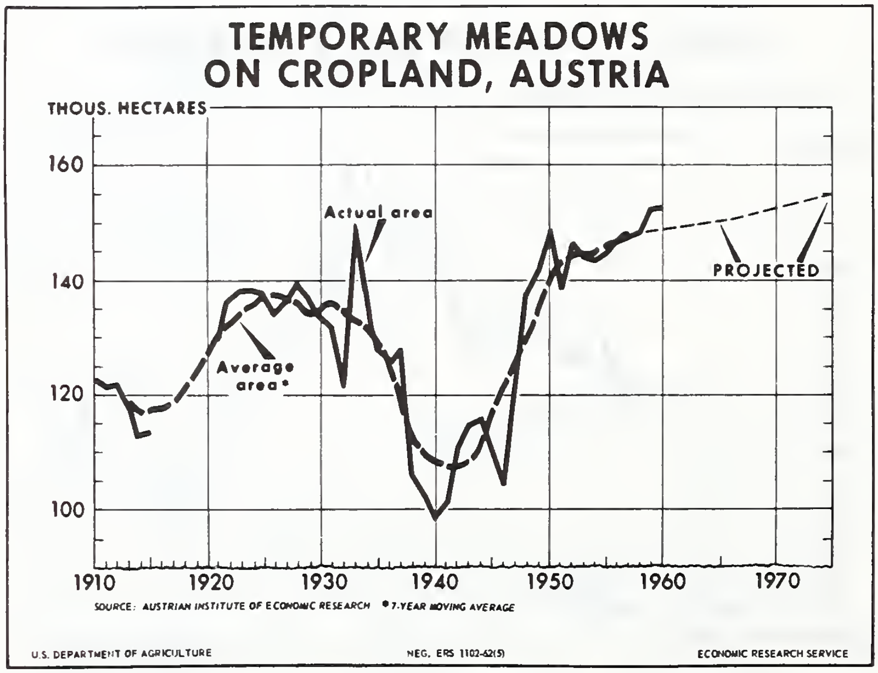


LAND IN CLOVER, AUSTRIA

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1057-62(4) ECONOMIC RESEARCH SERVICE

Figure 24



TEMPORARY MEADOWS ON CROPLAND, AUSTRIA

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH *7-YEAR MOVING AVERAGE

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1102-62(5) ECONOMIC RESEARCH SERVICE

Figure 25

Table 60. – Arable land under forage and other crops, specified periods since 1910 and projections for 1965 and 1975, Austria

Year or period	Clover and clover-grass	Hay 1/	Total	Other crops				
				Mixed grain	Field vege-tables	Corn for green forage and silage	Fodder mixed with vetch	Not item-ized
			1,000 hectares					
1910	200	123	-	-	-	-	-	-
1921	172	129	-	-	-	-	-	-
1934-38	251	125	128	9	21	21	19	58
1957*	242	148	116	15	8	29	14	50
1958	244	148	119	14	8	30	15	52
1959	232	152	108	18	8	27	11	44
1960	219	153	115	19	9	32	11	44
1965*	205	150	105	22	9	30	10	44
1975*	166	155	100	25	9	30	8	28

Source: Austrian Central Statistics Office

1/ Areas used alternatively as arable land and as grassland.

* Estimate adjusted for random fluctuation as the 7-year moving average, centered (i.e., 1954-1960 for 1957*; for 1965 and 1975 the extrapolated 7-year moving averages are 1962-1968 and 1972-78, respectively.)

3. Projected Crop Production Level and Productivity

3.1 Volume of Past and Projected Crop Production

The volume of total production of the various crops is obtained by multiplication of the respective production areas and yields per hectare. Total production of grain crops (excluding corn) was 1.73 million tons on the 1954-60 average, and 2.03 million tons in the record year 1960(table 61). According to the projections, and under the assumption of average growth conditions, production will rise to 2.10 million tons by 1965, and to 2.50 million tons by 1975. The shares of wheat and barley in total grain production rose from 25 percent and 17 percent in the period 1934-38 to 33 percent and 23 percent in 1954-60. They will further increase to 36 percent and 28 percent in 1965 and both will increase to 35 percent by 1975. On the other hand, the shares of rye and oats were 32 percent and 26 percent of total grain production in 1934-38 and 23 percent and 20 percent in 1954-60. They will continue to decrease and will amount to about 20 percent and 15 percent in 1965, and about 18 percent and 10 percent by 1975. The projected quantity of oats harvested in 1965 will be 11 percent smaller and that of rye 3 percent smaller than on the 1954-60 average, but the projection calls for 32 percent more wheat and 51 percent more barley. From 1965 to 1975, the production of oats is expected to continue to decline (decreasing by 22 percent) and that of all other grain crops is expected to continue increasing (i. e., increases of 48 percent for barley, 23 percent for mixed grain, 17 percent for wheat, and 7 percent for rye).

The production of row crops has also risen since 1934-38. In 1954-60, the average corn crop was 7 percent smaller, but that of fodder beets, potatoes, and sugarbeets increased by 14 percent, 17 percent, and 48 percent, respectively (table 62). On the basis of the projections for 1965, total production of corn, potatoes, and sugarbeets will rise by 36 percent, 23 percent, and 21 percent, respectively, compared with the average crop in 1954-60. Total output of fodder beets will fall by 9 percent compared with the average crop in 1954-60. In 1975, 21 percent more corn, 9 percent more sugarbeets, 9 percent more potatoes, but 12 percent less fodder beets will be harvested than in 1965.

Total plant production includes also some special crops, as for instance vegetables grown on fields, wine, and fruit. There are no statistical data on vegetable horticulture which is carried out by 5,000 professional gardeners on about 5,000 hectares of land. The same holds for vegetable growing in small gardens and farm gardens. During the past years, vegetable farming covered about 8,000 hectares. Prior to 1938, this area had been more than twice its present size. The decrease in acreage has been overcompensated, however, by higher yields due to intensive fertilization and increased cultivation in glass and greenhouses. In the period 1954-60, about 230,000 tons of field vegetables were harvested on the average. According to the estimate of the Institute, production will rise to about 274,000 tons by 1965 and to 305,000 tons by 1975 (table 63). In 1954-60, production of wine amounted to 1.16 million hectoliters and the vineyard area to about 32,000 hectares. Production is estimated to reach 1.42 million hectoliters by 1965 and 1.79 mill. hectoliters by 1975. The increase in production will result from improvements in vine cultivation methods whereby larger and more regular yields are achieved.

On a long-term average, 600,000 tons of fruit were produced in Austria. The average crop in 1954-60 was 758,000 tons (excluding berries), but 1.46 million tons in 1958-60 due

Table 61. – Production of grains, by individual grain crop, specified periods since 1910 and projections for 1965 and 1975, Austria

Year or period	Total grain 1/	Wheat	Rye	Barley	Oats	Mixed grain
			1,000 tons			
1910	1,383	286	546	182	340	29
1921	1,023	219	354	1,149	295	6
1934-38	1,695	417	539	287	438	14
1957*	1,734	568	400	392	344	30
1958	1,643	549	397	336	333	28
1959	1,760	589	417	405	312	37
1960	2,031	702	353	589	343	44
1965*	2,111	750	410	591	307	53
1975*	2,495	880	438	872	240	65
			Index of production			
1965* (1957*=100)	122	132	103	151	89	177
1975* (1965=100)	118	117	107	148	78	123

1/ Total grain production excluding corn.

* Estimate adjusted for random fluctuation as the 7-year moving average, centered (i.e., 1954-60 for 1957; for 1965 and 1975 the extrapolated 7-year moving averages are 1962-68 and 1972-78 respectively.

Source: Austrian Central Statistical Office.

to record harvests. In 1958, the number of productive fruit trees was figured at 20.5 millions, of which 47 percent were apple trees, and 23 percent pear trees. About 1.6 million apple trees and 2.8 million pear trees yield only fruit for cider production. Also, the lower-grade "economy" varieties of apples are only in part sold for direct human consumption; the largest share is processed by the food industry or is used for livestock feeding.

In past years, many new fruit plantations have been set up in favorable locations with federal aid. They will yield full crops in a few years, notably high-grade pears, strawberries, apricots, peaches, and currants. Fruit production will, therefore, grow rapidly and will reach about 900,000 tons by 1965 and more than 1 million tons by 1975. There are plans for the establishment of collecting and assorting centers as well as of marketing cooperatives which will supply high-quality fruit to the home market and export surpluses or process them for fruit juices.

Table 62. – Production of row crops, by individual crop, specified periods since 1910 and projections for 1965 and 1975, Austria

Year or period	Corn	Potatoes	Sugarbeets	Fodder beets
		1,000 tons		
1910	104	1,216	346	—
1921	82	924	140	1/ 962
1934-38	170	2,845	1,130	2,079
1957*	158	3,335	1,670	2,366
1958	155	3,542	2,006	2,432
1959	146	2,946	1,951	2,071
1960	213	3,809	1,906	2,581
1965 2/	215	4,094	2,016	2,150
1975*2/	260	4,450	2,200	1,890
		Index of production		
1957* (1934-38=100)	93	117	148	114
1965 (1957*=100)	136	123	121	91
1975 (1965=100)	121	109	109	88

Source: Austrian Central Statistical Office.

1/ 1922.
2/ Estimated production areas times yields per hectare.

* 7-year moving average.

Green forage and hay are not included in "agricultural output" but the quantities produced are necessary to set up the feed balance and to calculate feed requirements and the import demand for feedstuffs. Table 64 shows the total production of hay in the past and the projections for 1965 and 1975 (green forage has been converted into hay). Hay production from meadows was overestimated by the official agricultural statistics and has been adjusted for correct meadow areas.

3.2 Volume and Productivity of Crop Production

The volume and the productivity of crop production was calculated from the total quantities harvested and the production areas of the four principal grain crops, wheat, barley, rye, and oats, and of corn, potatoes, sugarbeets, fodder beets, clover, and hay from arable land and from meadows. Table 65 shows the production and yield of crops in the

Table 63. – Production of field vegetables, wine, and fruit, specified periods and projections for 1965 and 1975, Austria

Year or period	Field vegetables	Wine	Stone fruit	Other fruit 1/
	1,000 tons (wine in 1,000 hectoliters)			
1934-38	-	1,084	379	72
1957*	230	1,163	647	111
1958	269	1,897	1,322	141
1959	209	728	291	111
1960	234	897	1,136	172
1965*	274	1,420	750	156
1975*	305	1,790	875	178
	Index of production			
1965 (1957*=100)	119	122	116	141
1975 (1965*=100)	111	126	117	114

Source: Austrian Central Statistical Office.

1/ Excluding berries.

* 7-year moving average.

past, and the projections for 1965 and 1975. The products just mentioned comprise more than four-fifths of the total volume of crop production. Production figures were expressed in terms of grain equivalent.

In 1954-60, crop production (in grain equivalent) was 16 percent higher, and in 1960 (due to extraordinarily favorable conditions) 29 percent higher than the 1934-38 average. According to the projections of production areas and yields per hectare, in 1965 the index of plant production will exceed the 1934-38 average by 34 percent, and in 1975 by 46 percent. In 1965, crop production will be 16 percent higher than in 1954-60, and in 1975, some 9 percent higher than in 1965.

The productivity per area unit is calculated by relating total crop production to total agricultural land area. The average yield per hectare (in terms of grain equivalent) rose from 19.0 quintals in the period 1934-38 to 24.2 quintals in 1954-60. On the basis of the individual projections worked out, it will further rise to 28.7 quintals by 1965, and to 32.2 quintals by 1975. By 1965, it will be 51 percent higher than in 1934-38, and 19 percent above 1954-60. By 1975, the average yield per hectare will be 12 percent above the level of 1965.

Table 64. – Hay production, by type, specified periods and projections for 1965 and 1975, Austria

Year or period	Clover-hay	Hay from arable land	Hay from meadows	
			Official statistics	Estimates of the Institute
		1,000 tons		
1910	785	387	-	-
1921	439	317	2,341	-
1934-38	1,233	550	3,397	-
1957*	1,480	776	4,680	4,215
1958	1,462	769	4,644	4,190
1959	1,454	796	4,756	4,220
1960	1,510	830	5,162	4,449
1965* 1/	1,538	900	-	4,700
1975* 1/	1,411	1,046	-	4,895
		Index of production		
1965 (1957* =100)	104	116		112
1975 (1965=100)	92	116		104

1/ Estimated production areas times yields per hectare.

* 7-year moving average.

Source: Austrian Central Statistical Office.

The annual growth rate of total crop production per hectare corresponding to the above projections amounts to 2.15 percent for the period from 1957* to 1965, and 1.16 percent from 1965 to 1975. (The annual growth rate for the period from 1958-60 to 1965 is 1.99 percent.) Between 1957* and 1965, the rate of increase will be more than twice as high as in the period from 1934-38 to 1957*, but between 1965 and 1975, it will be somewhat lower than in the past.

Projections of yields per hectare in the German Federal Republic for the period from 1954/55 to 1964/65 indicate annual growth rates of 1.5 to 2 percent. 26/ The projected rates for Austria are somewhat higher but it has to be considered that the consumption of fertilizers has still been far below the level in Germany. With increasing technological improvements, yields will presumably develop more rapidly than in countries where the productive capacity has already been more fully utilized. Actually, in these countries the growth rate of crop production has already declined earlier than in Austria.

26/ Hanau,A., and Krohn, H. B., "Die langfristigen Absatzaussichten der westdeutschen Landwirtschaft bis 1965," Agrarwirtschaft, No. 10, Vol. 1956, p. 307.

Table 65. – Volume and productivity of crop production, specified periods since 1934, and projections for 1965 and 1975, Austria

Year or period	Cropland and grass-land area 1/ 1,000 hectares	Volume of production				Yield per hectare			
		Total 1,000 tons 2/	Index			Quintals	Index		
			1934-38 = 100	1957* =100	1965 =100		1934-38 = 100	1957* =100	1965* =100
1934-38	2,782	5,280	100.0	-	-	19.0	100.0	-	-
1957*	2,535	6,133	116.2	100.0	-	24.2	127.4	100.0	-
1958	2,542	6,161	116.7	100.5	-	24.2	127.4	100.0	-
1959	2,510	6,082	115.2	99.2	-	24.2	127.4	100.0	-
1960	2,497	6,806	128.9	111.0	-	27.3	143.7	112.8	-
1965*	2,465	7,085	134.2	115.5	100.0	28.7	151.1	118.6	100.0
1975*	2,390	7,704	145.9	125.6	108.7	32.2	169.5	133.1	112.2

1/ Area under wheat, rye, barley, oats, potatoes, sugarbeets, fodder beets, clover, as well as arable land used for hay production and meadows (including alpine meadows for hay production, excluding extensively used non-alpine meadows "Streuwiesen").

2/ In terms of grain equivalent: grain crop = 1, potatoes and sugarbeets = 0.25, fodder beets = 0.10, and hay = 0.43.

* 7-year moving average.

V. AGRICULTURAL PRODUCTS: PROJECTION OF ANIMAL PRODUCTION

In appraising the future production for all important livestock products in Austrian agriculture, the present discussion focuses on livestock numbers, their composition and rates of turnover, yield potentials, and the projection of the output of milk, meat, and eggs.

1. Past and Projected Stock of Animals

1.1 Livestock numbers, composition, and turnover, from 1910 until 1960

Cattle. Favored by large pasture and grassland area, cattle breeding and livestock farming occupy a predominant position within Austrian agriculture. In terms of livestock units at 500 kilograms live weight each, cattle account for 74 percent of the total livestock Cattle production is closely interrelated with other branches of production, and cattle numbers as well as beef production and milk output are rather inflexible.

From 1910 until 1939, cattle numbers showed a rising tendency because root crop and fodder production was intensified and more feedstuffs were imported. In 1939, about 2.62 million head of cattle were kept, which was 11 percent more than the 2.36 million head kept in 1910. Table 66 shows past and present developments in cattle numbers for the different provinces.

In spite of the extreme scarcity of feedstuffs and meat, stock numbers were reduced only little during the wars of 1914-18 and 1939-45. On account of threatening monetary inflation, producers were eager to preserve their real assets. The government was also interested in sparing the stock of milking cows because after the complete loss of imports the availability of fat depended largely on the volume of butter production. As a consequence of the disproportion between the size of stocks and the volume of feed supplies, this policy proved to be unsuccessful and production declined continuously. It would have been more economical to reduce the stocks by slaughtering low-yielding animals, and to establish in this way a more favorable relation between stock numbers and feed supplies.

In 1945 and following years, when large numbers of animals were expropriated and taken out of the eastern provinces by the Occupation Force, cattle numbers decreased rapidly. According to the fall census of 1945, the stock amounted to 2.19 million head, 15 percent less than in 1938. In Vienna, Lower Austria, and the Burgenland, cattle numbers had declined by 27 percent, and in the remaining federal territory, by 9 percent. Later on, some animals raised in the western provinces were shipped into the eastern parts of the country. But in 1946 and 1947, fodder production was low due to heavy droughts and cattle numbers declined. At the end of 1948, cattle numbers amounted to only 2.11 million head (18 percent less than in 1938). In Vienna, Lower Austria, and the Burgenland, stocks were 23 percent below the prewar level, and in the other provinces they were 16 percent below this level.

Although cattle numbers increased after 1948, by 1960 numbering 2.39 million head, only 93 percent of the last prewar level was reached. The difference was highest in the Burgenland (amounting to 16 percent) and lowest in Upper Austria (2 percent). Only in

Table 66. - Cattle numbers, by Federal Provinces, specified years, 1910-60, Austria

Year	Total	Lower Austria incl. Vienna	Burgenland	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
					1,000 head				
1910	2,358	603	144	553	129	468	208	195	59
1920	2,325	613	134	575	126	420	207	181	67
1923	2,162	559	125	529	122	409	186	176	58
1934	2,349	646	134	556	127	433	185	201	66
1938	2,579	693	141	609	147	495	240	190	64
1939	2,620	713	145	618	148	494	244	191	66
1940	2,583	701	142	604	146	492	247	190	65
1944	2,536	674	135	591	150	483	240	186	67
1948	2,108	531	112	501	125	421	193	167	60
1950	2,280	581	113	551	141	443	199	190	62
1951	2,284	591	116	558	139	441	187	189	63
1955	2,346	614	120	566	139	452	197	198	60
1958	2,279	600	116	562	137	428	184	192	59
1959	2,308	602	115	568	138	439	187	196	62
1960	2,387	618	119	590	143	460	196	196	65
					Index (1938=100)				
1910	91	87	102	91	87	94	87	103	92
1920	90	90	95	95	86	84	87	95	104
1923	84	81	89	87	83	83	77	93	91
1934	91	93	95	92	86	87	84	106	103
1938	100	100	100	100	100	100	100	100	100
1939	101	102	103	101	101	100	102	101	103
1940	100	101	101	99	99	99	103	100	102
1944	98	97	96	97	102	98	100	98	105
1948	82	77	79	82	85	85	80	88	94
1950	88	84	80	90	96	89	83	100	97
1951	89	85	82	92	95	89	78	99	98
1955	91	89	85	93	95	91	82	104	94
1958	88	87	82	92	93	86	77	101	94
1959	89	87	82	93	94	89	78	103	97
1960	93	89	84	97	97	92	82	103	102

Vorarlberg was the stock 2 percent higher than before the war. Because cattle numbers have been held down, nearly the entire live weight gains of the stock could be put at the disposal of consumers, and the yields per animal have been raised by putting greater emphasis on selective breeding and better feeding.

The composition of the stock has also changed. During recent years, the average age of the stock has markedly decreased and the rate of turnover has accelerated. At the end of 1960, the number of cattle in the age group from 3 months to 2 years was 5 percent higher than before the war. The number of calves exceeded the prewar level by 45 percent, but the stock of milking cows was 9 percent lower. The number of oxen and bulls (over one year of age) had dropped to less than half the prewar figure and their proportion in the total stock aged one year and over amounted to only 11 percent (1910: 23 percent; 1938: 20 percent), because draft animals were increasingly being replaced by tractors.

The accelerated rate of turnover and the higher proportion of younger age groups caused a sharp rise in the rate of withdrawals and in the proportion of calves raised (table 67). In 1937, about 347,000 head of cattle or 14 percent of the total stock (excluding calves) were withdrawn for commercial and farm slaughter, or they were exported for breeding, slaughter, or milk production. In 1960, withdrawal already amounted to 450,000 head or 22 percent of the total stock. The rising number of withdrawals resulted in increased calf-rearing to refill the stock. In 1937, the number of calves raised was relatively low, amounting to 346,000 head (or 14 percent of the cattle stock). But in 1960 the number of calves reached 514,000 head (or 25 percent of the total stock). At present almost all the heifer calves and also one-third of the male calves are reared because greater emphasis is being put on baby-beef production. The higher rate of turnover has increased the market supply of meat and has also improved meat quality. It also resulted in more efficient use of feedstuffs and in reduced production costs.

Although there are at present fewer cows kept and more calves raised than before the war, a larger number of calves is slaughtered. This is due to an increase in the fertility rates as a consequence of artificial insemination, the control of bovine brucellosis, and the reduction of losses. The number of calf births increased from about 797,000 or 59 percent of the stock of milking cows in 1937 to 978,000 or 80 percent in 1960 (table 68). Calf slaughter fluctuated between 412,000 and 562,000 animals per year, and the slaughter rate (in relation to calf births) lay on the average between 55 and 56 percent. In 1953, the slaughter rate was relatively high (62 percent) but rather low (46 percent) in 1960.

In Austria, several breeds of cattle are kept. At the end of 1959, the composition of the stock by breeds was as follows: Fleckvieh (Simmenthal) 46 percent, Pinzgauer 15 percent, Braunvieh (Brown Swiss) 14 percent, Blondvieh and Murbodner 9 percent. The rest consisted of other breeds and crossings. Since 1954, the year of the second last survey, the Simmenthal and the Brown Swiss breeds increased by 15 percent and by 6 percent, respectively, whereas the Murbodner, Pinzgauer, and Blondvieh breeds declined respectively by 21 percent, 7 percent, and 5 percent. There is a preference for the Simmenthal and Brown Swiss which are higher priced than other breeds because they consist overwhelmingly of heavy animals with high productive capacities.

Cattle breeding in Austria has been closely adjusted to the natural conditions of soil and climate and to the feed situation. In breeding, the animals are mostly selected for

Table 67. – Cattle numbers and withdrawals, specified years, 1937-60, Austria

Year	Cattle numbers 1/ (excl. calves)	Withdrawals 2/	Rate of withdrawals	Number of calves raised 3/	Proportion raised of total born
	1,000 head	1,000 head	Percent	1,000 head	Percent
1937	2,413	347	14.4	346	14.4
1949	1,950	270	13.8	338	17.3
1950	2,018	297	14.7	390	19.3
1951	2,112	337	16.0	328	15.5
1952	2,103	331	15.8	403	19.2
1953	2,176	386	17.7	345	15.9
1954	2,135	395	18.5	379	17.7
1955	2,119	363	17.1	400	18.9
1956	2,157	411	19.1	386	17.9
1957	2,132	440	20.6	405	19.0
1958	2,097	451	21.5	421	20.1
1959	2,067	454	22.0	467	22.6
1960	2,080	450	21.6	514	24.7

1/ December of preceding year.
2/ Slaughter for domestic consumption plus exports of cattle for breeding, slaughter, and other uses (excluding imports of slaughter cattle).
3/ Withdrawals plus/minus inventory changes minus imports of cattle for breeding and other nonslaughter uses.

multiple-purpose performance (milk, butterfat, and meat). There are no pure meat-type breeds in Austria. Some of the breeds (e. g., Murbodner and Blondvieh) yield satisfactory yields of milk and meat, even under poor feeding conditions. As the quality and the quantity of the feed base is gradually improved, however, the problem of unifying breeds will become important. This would make it possible to enlarge the various breeding areas, to develop standard breeding methods, and to increase the exports of breeding, slaughter, and other-use animals. However, this would require revision of certain legal provisions concerning animal breeding. The profitability of cattle fattening could also be increased through the crossing of different breeds because the animals of the F_1-generation are healthier, convert feed more efficiently, mature earlier, and develop faster. Artificial insemination has strongly favored the breeding of crossings during recent years, because it is less complicated and more efficient to keep high-rated male breeding animals of different breeds in a few public or privately owned breeding centers than to have larger numbers scattered over many communities.

Hogs. The number of hogs at the end of 1960 amounted to 2.99 million and was only slightly above the stock in the years of 1934, 1938, 1955, and 1957 (table 69). Prior to 1930, and between 1940 and 1950, the number of hogs raised in Austria was lower because feed imports were insufficient and domestic grain and potatoes were needed to compensate for the lack of protein foods during the war and in the immediate postwar years.

Table 68. - Calf births and calf slaughter, specified years, 1937-60, Austria

Year	Stock of milking cows 1/	Calf births 2/	Fertility rate	Calf slaughter 3/	Slaughter rate 4/
	1,000 head	1,000 head	Percent	1,000 head	Percent
1937	1,347	797	59.2	451	56.6
1949	1,152	776	67.4	412	53.1
1950	1,202	8.5	67.8	442	54.2
1951	1,248	815	65.4	475	58.2
1952	1,241	882	71.0	487	55.3
1953	1,265	901	71.2	562	62.4
1954	1,273	942	74.0	543	57.6
1955	1,287	937	72.8	533	56.9
1956	1,278	915	71.6	526	57.4
1957	1,264	953	75.4	541	56.8
1958	1,261	956	75.8	523	54.7
1959	1,234	953	77.2	470	49.3
1960	1,219	978	80.2	452	46.2

1/ December of preceding year; including heifers of 2 years and over.
2/ Total cattle numbers at the end of the year minus total cattle numbers at the beginning of the year, plus domestic slaughterings, plus exports of cattle for breeding, slaughter, and other uses, minus imports of cattle for breeding and other nonslaughter uses.
3/ Including exports.
4/ As percentage of the calf crop.

Prior to 1914, the central regions of hog raising in the Austro-Hungarian Monarchy were represented by areas which are now parts of Poland, Hungary, Rumania, and Yugoslavia. In the region of the present Austrian territory, swine fattening was mostly limited to local demand. Food supplied to Vienna came mainly from the eastern agricultural regions of the Monarchy.

Stocks developed differently in the various provinces. Compared with 1938, hog numbers in 1960 were lower in Styria (a decline of 10 percent) and Lower Austria (a decline of 3 percent) but higher in Carinthia (a rise of 4 percent) Burgenland (a rise of 6 percent) Upper Austria (a rise of 23 percent) Salzburg (a rise of 40 percent) Tyrol (a rise of 45 percent), and Vorarlberg (a rise of 52 percent).

During World War II and in the postwar period, many new industries were set up in the western provinces, particularly in Upper Austria. As a consequence, shifts in the pattern of regional employment and in the population density from the eastern to the western part of the country have occurred. Also the tourist traffic increased much faster in the western provinces. This development caused a shift in the demand for meat and meat products. The adjustment of hog fattening to the changing demand structure was easy,

Table 69. – Hog numbers by Federal Provinces, specified years, 1910-60, Austria

Year	Total	Lower Austria incl. Vienna	Burgenland	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
					1,000 head				
1910	1,935	705	99	355	23	525	172	37	17
1920	1,330	556	84	240	14	290	117	16	14
1934	2,823	1,101	186	593	42	571	235	64	33
1938	2,868	1,105	193	587	50	612	235	64	23
1951	2,448	816	170	583	57	515	208	74	25
1955	2,933	1,037	203	696	66	566	248	88	30
1959	2,845	994	188	694	66	548	233	90	32
1960	2,990	1,067	205	722	70	553	245	93	35
					Index (1938 = 100)				
1910	67	64	51	61	45	86	73	59	74
1920	46	50	43	41	29	47	50	25	62
1934	98	100	96	101	84	93	100	100	141
1938	100	100	100	100	100	100	100	100	100
1951	85	74	88	99	114	84	88	116	110
1955	102	94	106	119	132	92	105	137	131
1959	99	90	98	118	132	90	99	141	137
1960	104	97	106	123	140	90	104	145	152

because hog production is only loosely connected with other branches of agricultural production and can be intensified by means of purchased feeds within a relatively short time.

In Austria, swine fattening has depended to a large extent on foreign feedstuffs in the past as well as at present. In 1952, about 400,000 tons of the total feed grain imports (amounting to 500,000 tons) were used for hog raising. This resulted in the production of 100,000 tons of live weight gain. Since total output in terms of live weight amounted to 242,000 tons and the market supply to 123,000 tons, 41 percent of the total output or 81 percent of the market production was derived from imported feedstuffs. The latter figure is based on the assumption that hogs for farm slaughter were raised on self-produced feedstuffs. In 1960, about 550,000 tons of feed grain were imported of which approximately 450,000 tons were used for hog fattening. The total production of hogs (live weight) amounted to 312,100 tons and the market supply to 203,900 tons (preliminary figures): 112,500 tons were produced on the basis of foreign feedstuffs. The extent of dependence on imported grains was 36 percent in relation to total output of hogs, and 55 percent in relation to market supply. In the case of trade disturbances, the high degree of dependence of pork production on foreign feed supplies represents a danger not only to the regular supply of meat but also to the availability of bread grain and potatoes.

If supply and demand interact freely, hog prices and hog output show strong fluctuations (hog cycle). These cycles have been considerably dampened since 1955 by the introduction of a "price corridor" (maximum and minimum prices) for live hogs, and measures of the market authorities to control supplies. Also the number of breeding sows serviced has been adjusted to the seasonal fluctuations of demand more effectively than in the past. During 1951-55, the annual average number of bred sows in March was 13.0 percent higher than in December. In 1956-60, however, the difference had decreased to only 7.5 percent. Similarly, in 1951-55, the average number of bred sows declined from June to September by 20.1 percent whereas in 1956-60, the decrease amounted to only 10.4 percent. If the number of breeding sows serviced in fall were further increased, a larger number of hogs would be ready for slaughter in summer and fall when producer prices are highest. Further, the seasonal peaks of supply in spring could be eliminated and the shortage of domestic supply in summer and winter could be reduced. This would require the ensilage of more feed potatoes in the fall, and an improvement of stables to raise the piglets born in winter without substantial losses.

The turnover of the stock of hogs has been accelerated considerably since 1951 due to the breeding of early maturing strains and to improvements of feeding and management practices. Table 70 shows the turnover of swine stocks since 1951. In 1951/52, the withdrawals for slaughter and exports from March to February amounted to only 88.5 percent of the initial stock, but in 1960/61 they reached 110.0 percent. Inversely, the final stock was still relatively high in 1951/52 (113.0 percent of the number of piglets reared) but low in 1960/61 (91.4 percent). In spite of the higher rate of turnover, the average live weight of marketed hogs showed only a slight temporary decrease and has increased again in recent years.

Other livestock. The number of horses amounted to 150,200 in 1960 (table 71). This was less than half the number in 1910 and about two-fifths less than in 1938. The strong decrease was due to the mechanization of agriculture and differed with respect to production regions, farm size, pattern of land use, and topographical conditions. The sharpest

Table 70. – Turnover of hog stocks from 1951/52 to 1960/61, Austria (the years indicated refer to the periods between March censuses)

Item	Unit	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61
Stock at beginning of year	million head	2.09	2.08	2.35	2.18	2.42	2.44	2.36	2.57	2.48	2.60
Piglets reared	do.	1.84	2.32	2.06	2.39	2.44	2.37	2.79	2.64	2.80	3.01
Withdrawals by slaughter and exports	do.	1.85	2.05	2.23	2.15	2.42	2.44	2.58	2.68	2.67	2.86
Inventory changes	do.	-0.01	+0.27	-0.17	+0.24	+0.02	-0.08	+0.21	-0.09	+0.12	+0.15
Stock at end of year	do.	2.08	2.35	2.18	2.42	2.44	2.36	2.57	2.48	2.60	2.75
Withdrawals as percentage of initial stock	Percent	88.5	98.6	94.9	98.6	100.0	100.0	109.3	104.3	107.7	110.0
Final stock as percentage of piglets reared	Percent	113.0	101.3	105.8	101.3	100.0	99.6	92.1	93.9	92.9	91.4
Average live weight :											
Commercial slaughterings	Kg.	106	106	104	102	102	102	102	103	104	105
Farm slaughterings	Kg.	136	132	133	133	134	133	130	129	123	128

decrease since 1938 occurred in Lower Austria (a decline of 49 percent) and Upper Austria (a decline of 46 percent); in Tyrol and Styria horse numbers declined only 12 percent.

The number of mares with colts decreased from 30,000 in 1938 to 14,100 in 1960. Even though mechanization is increasing, there is still a limited, but brisk foreign and domestic demand for working horses, and the volume of breeding has been stabilized for about 2 years. The present stock of young horses and fillies, however, is much too low to offset the natural withdrawal of old horses. If the average lifetime of horses is assumed to be 15 years, the stock of 4,000 fillies at the end of 1960 will only be sufficient to keep a stock of 60,000 horses (that is, two-fifths of the present stock). On the basis of the projections of the demand for total draft power and for tractors, the demand for working horses may be estimated at 105,000 in 1965, and at 85,000 in 1975. It is expected, therefore, that the prices of fillies will rise, the volume of colt slaughter (which is very large at the present time) will be restricted, and breeding will be intensified.

So far, sheep production has been closely connected with the supply of textiles. From 1914 to 1924 and from 1939 to 1949, when the supply of textiles was scarce, sheep raising was intensified. When the supply situation became normal, and cheap textiles were substituting for woolen cloth, the interest in sheep raising declined again. In 1960, there were only 175,000 sheep in Austria, about 46 percent less than in 1938 (table 72). The provinces with the largest numbers of sheep are at the present time Tyrol, Salzburg, Carinthia, Styria, and Lower Austria. The sheep are kept on extensive rough grazings and on alpine pastures. Due to the continental climate, fine wools matching the quality of the Australian Merino wool cannot be produced in Austria. In general, the wool of the domestic mountain sheep is used for the production of rough woolen cloth, blankets, felts, and rugs. Sheep for fur production (Karakul breeding) are of little importance in Austria. Mutton is not popular in this country. Sheep rearing will, therefore, continue to decline.

Goats are usually kept by persons who are engaged in farming as a sideline on a very small basis. Due to the favorable employment situation, their number is decreasing from year to year. Consequently, the number of goats in 1960 was less than half of that in 1938 (table 73).

At the end of 1960 the number of chickens amounted to 9.79 million, that of ducks to 0.18 million, and that of geese to 0.16 million (table 74). The level of 1938 was exceeded by 8 percent for chickens, 54 percent for ducks, and 15 percent for geese. As in the case of pigs, the regional structure of poultry production was influenced by the establishment of industrial settlements and by population movements as well as by the tourist traffic. According to the 1960 census, the number of chickens in Lower Austria was 12 percent below the prewar level, while in Upper Austria, Vorarlberg, and Salzburg, it was 20, 33, and 45 percent higher. Poultry production is also partly dependent on imported grain and protein feeds, but not to such a high degree as hog raising.

Poultry breeding and fattening was extended because with rising income the demand for eggs and broilers has increased, and because the demand has shifted from expensive veal to poultry. Poultry for slaughter has remained relatively cheap because larger quantities were imported at preferential tariffs or duty free. Modern management requires only 2.5 to 2.8. kilograms of feed stuffs (grain equivalent) per kilogram of meat, particularly if the chicks come from pedigree flocks of early maturity, and if they are properly kept and fed.

Table 71. – Horse numbers, by Federal Provinces, Austria, specified years, 1910-60

Year	Total	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
					1,000 head				
1910	320	144	22	62	12	39	29	8	3
1920	252	103	16	49	9	34	29	9	3
1923	283	118	18	59	12	34	29	10	3
1934	261	110	20	57	10	27	25	9	3
1938	247	101	18	56	11	24	25	8	3
1951	276	100	22	65	14	32	30	11	3
1955	236	87	19	52	12	28	27	10	2
1959	163	55	13	34	9	22	21	8	2
1960	150	49	12	30	9	21	20	7	2
					Index (1938 = 100)				
1910	130	143	120	111	106	163	113	100	127
1920	102	103	86	88	78	142	113	103	118
1923	115	118	96	105	104	141	115	116	134
1934	106	109	108	102	94	112	97	106	120
1938	100	100	100	100	100	100	100	100	100
1951	112	99	117	115	124	133	119	126	109
1955	96	85	104	92	106	118	107	113	94
1959	66	54	70	60	83	94	81	93	74
1960	61	49	67	54	82	88	80	88	67

Table 72. – Sheep numbers, by Federal Provinces, Austria, specified years, 1910-60

Year	Total	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
					1,000 head				
1910	300	44	7	32	36	63	63	51	5
1920	455	69	5	64	41	78	109	62	28
1934	263	32	3	19	40	56	58	51	5
1938	315	33	1	19	47	72	71	66	7
1951	332	56	1	28	47	69	58	63	10
1955	255	38	1	19	41	48	50	51	5
1959	185	27	0	12	36	31	32	43	4
1960	175	26	0	11	35	31	30	39	3
					Index (1938 = 100)				
1910	95	134	538	170	76	88	89	77	71
1920	144	209	387	340	88	108	154	94	418
1934	84	96	212	98	85	78	82	78	80
1938	100	100	100	100	100	100	100	100	100
1951	105	169	116	149	99	96	82	95	154
1955	81	115	73	99	88	67	71	78	77
1959	59	81	37	63	76	44	45	65	53
1960	56	79	30	58	74	43	42	59	43

Table 73. – Goat numbers, by Federal Provinces, specified years, 1910-60, Austria

Year	Total	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
					1,000 head				
1910	239	94	5	35	16	25	21	31	10
1920	327	160	7	36	13	39	29	28	14
1934	326	156	12	48	20	27	22	34	8
1938	249	158	13	57	19	33	27	33	8
1951	310	153	11	43	14	31	24	26	8
1955	256	129	10	39	10	25	21	18	5
1959	175	90	6	28	6	17	14	11	4
1960	162	83	5	27	5	16	13	10	3
					Index (1938 = 100)				
1910	69	59	42	62	86	77	78	95	121
1920	94	101	53	64	70	118	107	86	161
1934	94	99	90	84	106	82	81	102	97
1938	100	100	100	100	100	100	100	100	100
1951	89	97	80	76	74	92	89	79	98
1955	73	81	75	69	50	75	76	55	63
1959	50	57	43	50	31	51	50	33	42
1960	46	53	38	47	26	48	48	30	38

Table 74. – Poultry numbers, by type of flock and Federal Provinces, specified years, 1934-60, Austria

(Thousands of birds)

Year	Total	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
Chickens:									
1934	8,679	3,692	776	1,704	217	1,274	459	387	170
1938	9,046	3,656	775	1,900	228	1,516	464	365	142
1951	6,920	2,447	521	1,509	216	1,240	442	340	205
1955	8,946	3,118	759	2,037	293	1,580	568	398	192
1959	9,797	3,247	827	2,303	331	1,769	714	417	189
1960	9,788	3,227	864	2,270	331	1,775	724	407	190
Ducks:									
1934	100	50	7	18	3	12	5	3	2
1938	120	65	10	23	3	12	4	2	1
1951	97	42	7	21	4	13	5	3	2
1955	145	63	13	40	5	14	6	2	1
1959	195	93	18	57	5	14	5	1	1
1960	185	89	20	60	5	13	5	2	1
Geese:									
1934	93	49	22	9	2	6	2	2	1
1938	138	78	25	19	3	9	3	3	0
1951	167	85	27	29	4	10	8	3	2
1955	196	92	41	36	6	11	6	3	1
1959	163	78	41	27	3	7	4	2	1
1960	159	76	43	26	2	6	3	2	1

The contribution of poultry production to the food supply of the population is usually underestimated for the following reasons: (1) The statistics of poultry stocks are very incomplete in any country, and (2) the poultry which is kept by the nonfarm population is not marketed but directly consumed in the household.

Livestock density. The number of animals (excluding poultry), in terms of livestock units at 500 kilograms live weight kept in Austria, amounted to 2.45 million in 1910, 2.63 million in 1938, and 2.35 million in 1960 (table 75). Compared with 1938, the stock of farm animals has on the average been reduced by 11 percent. The decrease was stronger in the eastern provinces (between 16 and 17 percent) than in the western provinces (between 0 and 7 percent).

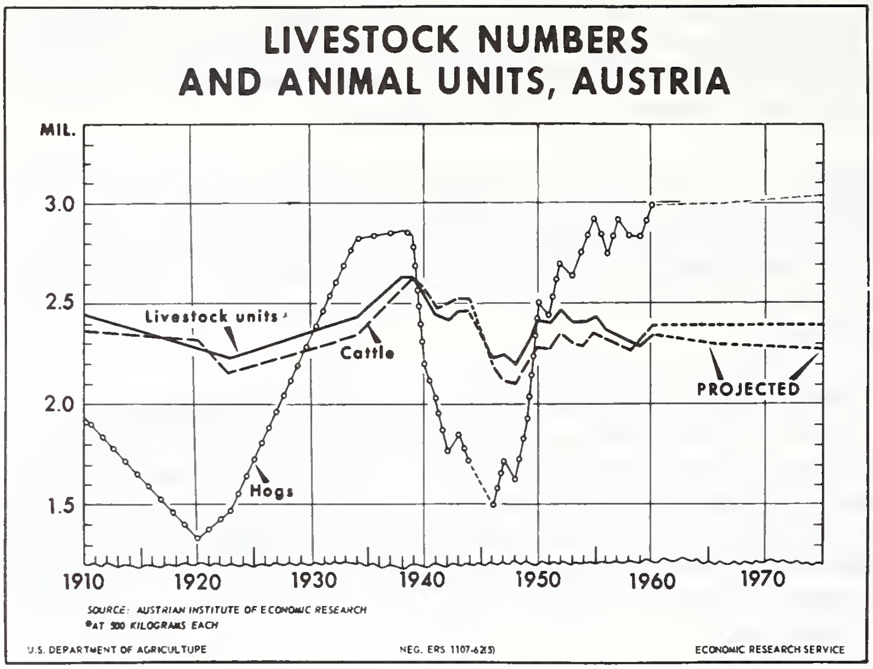
The livestock density (number of livestock units per 1,000 hectares of agricultural area) was 561 in 1910, 611 in 1938, and 579 in 1960. Although the stock of farm animals has decreased 4 percent since 1910, the livestock density in 1960 was 3 percent higher than in 1910, due to the reduction of agricultural areas. According to the regional distribution in 1960, livestock density has been highest in Upper Austria (851) and lowest in Tyrol (338). It has to be taken into account, however, that a major part of the agricultural area in the alpine regions consists of pastures and rough grazings which can be used only during short seasons.

There are close interrelations between animal stocks, feedcrop areas, and production of feedstuffs, milk, and meat. The relations between these factors provide important economic and technical indicators of farm mechanization and farm management. A livestock density below 0.5 livestock unit per hectare is usually regarded as low, that of 0.75 as medium, and that of more than unity as high. In former times it was assumed that the manure production from at least 0.7 livestock unit per hectare was required to maintain the fertility of the soil. Nowadays, the livestock density in many regions is much lower. Some scientists and experts believe that the soil will maintain its fertility in the long run with a very low livestock density or even without animals if "green fertilizer" is regularly applied and mineral fertilizers are used extensively. This problem, however, has not yet been completely resolved.

1.2 Projected livestock numbers until 1975

The annual random fluctuations of animal stocks are much smaller than those of areas under cultivation or of yields per hectare. Therefore, the annual data reflect the long-term trends fairly well and do not have to be smoothed by special methods (e. g., moving averages). The graphical extrapolation of past trends yielded estimates for 1965 and 1975 shown in table 76 and also in figures 26 and 27.

On the assumption of favorable growth conditions for feedcrops, with no droughts, cattle numbers will rise to about 2.40 million in 1965 and 1975, which is only slightly larger than in 1960. The number of milking cows is expected to drop from 1.13 million in 1960 to 1.08 million in 1965 and to 1.00 million in 1975. A larger decrease is unlikely because the higher rate of turnover requires the breeding of a larger number of calves.



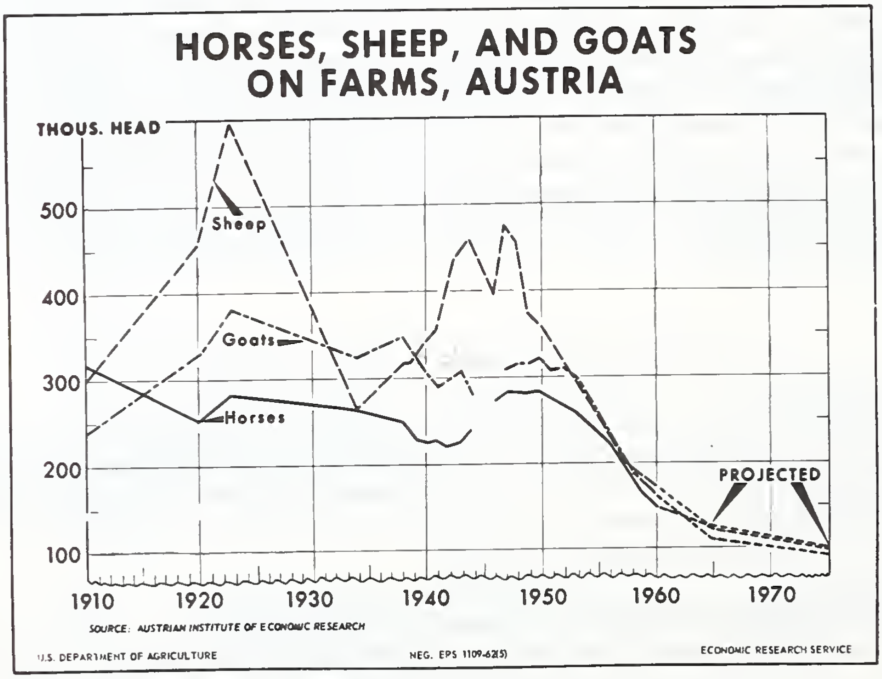
LIVESTOCK NUMBERS AND ANIMAL UNITS, AUSTRIA

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

*AT 500 KILOGRAMS EACH

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1107-62(5) ECONOMIC RESEARCH SERVICE

Figure 26



HORSES, SHEEP, AND GOATS ON FARMS, AUSTRIA

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

U.S. DEPARTMENT OF AGRICULTURE NEG. EPS 1109-62(5) ECONOMIC RESEARCH SERVICE

Figure 27

Table 75. – Estimated number of livestock units and estimated livestock density, by Federal Provinces, specified years, 1910-60, Austria 1/- Continued

Year	Austria	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
				Livestock units (in 1,000 units)					
1910	2,450	733	149	542	119	468	220	168	51
1920	2,287	677	132	532	112	402	218	156	59
1934	2,467	767	148	563	119	430	204	176	58
1938	2,631	790	153	598	136	481	232	184	55
1951	2,400	683	135	574	134	438	210	171	55
1955	2,437	701	139	575	131	445	217	176	52
1959	2,290	643	125	551	126	424	197	172	53
1960	2,346	654	128	565	129	438	204	171	56
				Livestock units per 1,000 hectares of agricultural area					
1910	561	604	579	781	325	679	485	318	316
1920	525	558	509	747	306	605	479	299	354
1934	565	636	578	813	325	613	441	338	354
1938	611	663	600	861	381	701	522	357	341
1951	588	628	610	869	392	658	486	328	390
1955	597	639	609	862	378	672	500	348	377
1959	565	589	540	830	367	655	459	339	385
1960	579	600	554	851	377	676	475	338	403

Table 75. Estimated number of livestock units and estimated livestock density, by Federal Provinces, specified years, 1910-60, Austria 1/ - Continued

Year	Austria	Lower Austria incl. Vienna	Burgen-land	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
	Livestock units per 1,000 hectares adjusted agricultural area 2/								
1910	802	643	642	814	950	963	935	1,309	1,192
1920	758	595	563	780	892	932	945	1,317	1,072
1934	810	673	629	850	943	910	887	1,379	1,123
1938	875	701	647	904	1,104	1,045	1,053	1,422	1,086
1951	860	671	655	914	1,114	1,003	1,036	1,346	1,039
1955	869	683	649	915	1,092	1,022	1,078	1,399	983
1959	822	629	576	881	1,060	987	995	1,384	1,046
1960	849	642	595	909	1,116	1,027	1,037	1,393	1,253

1/ Excluding poultry. The following conversion factors were used (one livestock unit represents a live weight of 500 kg): 1.33 for horses, 0.75 for cattle, 0.11 for pigs, and 0.08 for sheep and goats.

2/ Agricultural area adjusted by excluding rough grazing land.

Also the stock of pigs will on the whole increase only slightly, while the turnover will be further accelerated. The estimates are 3.00 million in 1965 and 3.05 million in 1975, compared to 2.99 million in 1960.

The stock of other animals, however, will change rather strongly. The number of horses will drop from 150,000 in 1960 to 121,000 in 1965 and to 98,000 in 1975. The projections include 105,000 working horses for 1965 and 85,000 working horses for 1975. The stock of sheep will decrease from 175,000 in 1960 to 125,000 in 1965, and to 100,000 in 1975; that of goats will decrease from a present level of 162,000 to 110,000 in 1965 and to 90,000 in 1975. The stock of poultry will be increased because the demand for poultry meat and eggs will rise strongly. The number of fowl is expected to be 10.8 million in 1965 and 12.0 million in 1975 (of which 9.7 and 10.8 million are hens). This will exceed the stock of 1960 by 10 and 21 percent, respectively. The number of ducks will reach 220,000 by 1965 and 250,000 by 1975; that of geese will reach 190,000 in 1965 and 210,000 in 1975, compared to 185,000 ducks and 159,000 geese in 1960.

The total stock of farm animals (excluding poultry) will amount to 2.31 million and 2.28 million livestock units in 1965 and 1975, respectively. In 1965, it will be 2 percent lower than in 1960 and in 1975, it will be 3 percent lower. Since the agricultural area will be reduced at about the same rate the livestock density will practically remain unchanged.

In 1960, the value of the total stock of farm animals (including poultry) at average 1952-56 prices amounted to AS 11.26 billion. It is estimated at AS 10.94 billion in 1965 and at AS 10.67 billion in 1975. This corresponds to the development since 1952. At that time, the value of the animal stock was AS 11.87 billion and by 1959 it had been reduced to AS 11.05 billion. Only in 1955 and in 1960 when there was an excellent feed crop and a low number of cattle slaughterings was the value increasing.

2. Projected Animal Production

2.1 Production of milk, meat, and eggs from 1937 to 1960.

The level of milk production in 1937 has been estimated at 2.37 million tons by the Ministry of Agriculture and Forestry. 27/ For the same year, the Statistical Yearbook of Austria of 1938 indicates an output of 2.54 million tons. Still another figure of 2.6 million tons is presented in the "Green Report of 1959" prepared by the Ministry of Agriculture and Forestry. In reply to an inquiry the Ministry stated that the figure cited in the "Green Report" was estimated by another agency but was not checked, and that the figure in the 1938 yearbook is a rough estimate. Since the official food balance sheet data of 1934-38 as well as the calculation of the caloric value of total food consumption are based on the figures of the "Long-Term-Program", they will also form the basis of our projections. It is likely, however, that prewar farm milk utilization for human consumption and for feed has been underestimated. There is little evidence that total consumption on

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27/ "Long-Term-Program der österreichischen Landwirtschaft für die Zeit von 1949/50 bis 1952. 53," March 7, 1949, Federal Ministry of Agriculture and Forestry.

Table 76. – Projected livestock numbers in 1965 and 1975, Austria 1/

Livestock class	1960 (1,000 head)	1965 (1,000 head)	1975 (1,000 head)
Cattle	2,387	2,400	2,400
of which milking cows	1,127	1,100	1,050
Hogs	2,990	3,000	3,050
Horses	150	121	98
of which draft horses	139	105	85
Sheep	175	125	100
Goats	162	110	90
Fowl	9,788	10,800	12,000
of which hens	8,730	9,700	10,800
Ducks	185	220	250
Geese	159	190	210

1/ Extrapolations based on the trends prevailing in recent years.

farms should have increased by 356,000 tons or 37 percent since 1937 while market deliveries rose only 117,000 tons or by 8 percent, especially when the agricultural population has decreased and producer's prices for milk have risen at a faster rate than the index of prices received by farmers. Household consumption increased 187,000 tons since 1937 (or 32 percent) and the quantity fed to livestock increased 169,000 tons (or 44 percent). In 1937, the producer's price for milk amounted to AS 0.21 per liter (weighted average of fresh whole milk and industrial milk), and to AS 1.88 in April 1961; accordingly, the milk price index rose to 895 (1937 = 100). At the same time, the index of prices received, as calculated by the Agricultural Accounting Company, was at 804.

In 1960, total milk production amounted to 2.84 million tons, about 20 percent more than in 1937 (table 77). In 1952, production was still below the 1937 level but it increased above this level in the following year. In 1960, about 1.52 million tons (54 percent) were delivered to dairies or to consumers directly, 0.77 million tons (27 percent) were consumed in farm households, and 0.55 million tons (19 percent) were used for feeding. From the total milk production in 1937, 59 percent was marketed, 24 percent was used in farm households, and 16 percent went into livestock production. But, as has been mentioned earlier, these data are not reliable.

Together with the reduction of total livestock, the number of cows also decreased. About 1.13 million milking cows were kept in 1960, 89,000 head (or 7 percent) less than in 1937 (table 78). On small farms 182,000 dairy cows (16 percent of total stock) were also used for draft work compared with 277,000 (23 percent) before the war. After the losses suffered during the war, cow numbers were raised again to 1.18 million by 1955. Since then, however, the stock has been decreasing at an annual rate of 10,000 head because of measures aimed at the rationalization of agricultural production. In arable

Table 77. – Production, market supply, and farm consumption of milk, specified years, 1937-60, Austria

Year	Quantity in 1,000 tons				Percent of milk production		
	Production	Market supply	Farm consumption		Market supply	Farm consumption	
			Households	Livestock feed		Households	Livestock feed
1937	1/ 2,369	1,405	579	385	59.3	24.4	16.3
1949	1,748	788	630	330	45.1	36.0	18.9
1950	2,085	980	699	406	47.0	33.5	19.5
1951	2,296	1,008	786	502	43.9	34.2	21.9
1952	2,311	1,067	769	475	46.2	33.3	20.6
1953	2,424	1,180	754	490	48.7	31.1	20.2
1954	2,539	1,278	765	496	50.3	30.1	19.5
1955	2,533	1,254	770	509	49.5	30.4	20.1
1956	2,613	1,295	788	530	49.6	30.2	20.3
1957	2,732	1,446	755	531	52.9	27.6	19.4
1958	2,752	1,454	763	535	52.8	27.7	19.4
1959	2,777	1,452	772	553	52.3	27.8	19.9
1960	2,842	1,522	766	553	53.6	27.0	19.4

1/ In the Statistical Yearbook of Austria of 1938, p. 73, milk production is estimated at 2.54 million tons.

Source: Central Statistical Office.

farming, higher productivity levels and lower production costs can be achieved quickly by the use of modern machinery like tractors, combine harvesters, and machines for cultivating and harvesting row crops. For dairy enterprises, however, it is much more difficult to improve efficiency and to reduce costs. On large farms cattle are frequently kept only during the winter for fattening, and in some cases, stock-farming has been abandoned completely. In principle it is preferable to feed fewer animals for optimum performance than to keep a larger herd under inadequate conditions. In former times, the stock of cattle frequently was too large. To some extent, the reduction in the number of cows is a result of an increasing labor shortage.

Milk yields per cow rose from an average of 1,958 kilograms in 1937 to 2,512 kilograms in 1960 (up 28 percent) due to performance testing and progress in selective breeding, as well as more and better feeds. Since 1951, milk yields per cow have increased fairly steadily at the average rate of 52.7 kilograms per annum. The present level of milk yields, however, is by no means satisfactory. Cost calculations have shown that it is not worthwhile to keep cows with an average yield of less than 3,500 kilograms per annum. In many western European countries average milk production per cow is much higher than in Austria. According to Food and Agricultural Organization statistics, the average yields in 1959 amounted to 4,150 kilograms in the Netherlands, 3,740 kilograms in Denmark, 3,300 kilograms in the German Federal Republic, and 3,240 kilograms in Switzerland.

In Austria at present not more than 15 to 16 percent of all dairy cows are kept under regular performance tests. Only herds which are owned by members of cattle breeding cooperatives are controlled. The expenses of control (AS 80 to AS 100 per cow per year) have been covered so far partly by federal aid and partly by the members of the cooperatives themselves. The relatively high financial burden has put a restraint on the willingness of farmers to join the testing program. By a recent supplementary law to the Market Regulation Act, however, all milk producers are required to make payments into a common fund (15 Groschen per liter of milk sold) regardless of their actual participation. 28/ This measure is expected to accelerate progress in production efficiency. Out of 12 countries of western Europe, two (the Netherlands and Denmark) keep more than 60 percent of all cows under performance control, in 6 countries 30 percent are tested, and in 4 countries (among them Austria) the coverage varies between 10 and 20 percent.

Dairy farming has developed very differently in the various Federal Provinces. The reduction in milking cows since 1937 amounted to 18 and 15 percent in Lower Austria and Burgenland, 5 and 3 percent in Carinthia and Tyrol, and 1 percent in Upper Austria as well as in Styria (table 79). In Salzburg and Vorarlberg, the number of cows increased by 1 percent and by 3 percent, respectively. In 1959, only Salzburg, Styria, Carinthia, and Tyrol had a larger stock of cows than in 1951, and these had increases of 5 percent, 5 percent, 4 percent, and 2 percent, respectively. 29/

Milk yields per cow have developed differently, varying according to breeds, improvements in breeding methods, and the feed supply situation. In comparison to 1937, yields showed the largest increase in Tyrol (up to 42 percent), and the smallest gain in Lower Austria (up 13 percent). In 1959 average milk yields per cow were by far the highest in Vorarlberg (3,065 kilograms) and the lowest in Carinthia (2,224 kilograms). The yields in Tyrol (2,691 kilograms) as well as in Salzburg (2,665 kilograms) and in Upper Austria (2,541 kilograms) fall considerably short of those achieved in Vorarlberg. The gap between the highest and the lowest yields is larger at the present time than before the war. The yields reached in Vorarlberg exceeded the federal average in 1937 by 19 percent and in 1959 by 26 percent.

The different development of cow numbers and yields per cow is reflected by the level of total milk production. In Salzburg, Tyrol, and Styria, the total volume of production in 1959 was 48, 38, and 32 percent higher than in 1937, but in Burgenland only 6 percent. In Lower Austria, production had even decreased 10 percent. Compared with 1951, the differences are somewhat smaller; Upper Austria showed the strongest increase (a rise of 30 percent) and Vorarlberg the weakest increase (a rise of only 8 percent). The development of market supply was similar to that of total production. In 1959, some of the western and southern Provinces sold much more milk than in 1937 while Lower Austria supplied less. The statistical data on milk consumption by the agricultural sector itself are unreliable and no indications of future development can be derived therefrom.

28/ 1 AS = 100 groschen. The payment would be, therefore, about twenty-six cents per 100 pounds of milk sold.

29/ When this report was written figures on regional development of milk production and disappearance in 1960 were not available.

Table 78. – Cow numbers, milk production, and milk yields per cow, specified years, 1937-60, Austria

Year	Stock of milking cows			Milk production		Milk yield per cow	
	Total number 1/ (1,000 head)	Used for draft work 2/					
		1,000 head	Percent	1,000 tons	1937 = 100	Kilograms	1937 = 100
1937	1,210	277	22.9	3/ 2,369	100.0	3/ 1,958	100.0
1949	1,027	287	27.9	1,748	73.8	1,701	86.9
1950	1,100	282	25.6	2,085	88.0	1,895	96.8
1951	1,126	286	25.4	2,296	96.9	2,038	104.1
1952	1,131	281	24.8	2,311	97.6	2,042	104.3
1953	1,153	268	23.2	2,424	102.3	2,102	107.4
1954	1,163	255	21.9	2,539	107.2	2,182	111.4
1955	1,181	250	21.2	2,533	106.9	2,144	109.5
1956	1,176	242	20.6	2,613	110.3	2,223	113.5
1957	1,161	230	19.8	2,732	115.3	2,352	120.1
1958	1,156	217	18.8	2,752	116.2	2,379	121.5
1959	1,142	191	16.7	2,777	117.2	2,433	124.3
1960	1,131	182	16.7	2,842	120.0	2,512	128.3

1/ Averages over the year.
2/ Stock in December.
3/ In the *Statistical Yearbook of Austria* of 1938, p. 13, milk yield per cow is estimated at 2,100 kilograms and total milk production at 2.54 million tons.

Source: Central Statistical Office.

The shifts in the regional pattern of milk production apparently have been caused by changing milk price situations. Prior to 1938, producer's milk prices were not uniform throughout the country. Milk from Lower Austria and Burgenland, which was mostly used as fresh whole milk in Vienna, sold at a price one-third higher than milk from other Provinces which was mostly processed for dairy products. Since 1938, however, the milk market has been strictly regulated and a uniform producer's price for the total federal area has been established. At present, butter imports are blocked, and the surplus production of butter and cheese is exported at partly reduced prices Price equalization and the construction of numerous dairies have brought about regional shifts in the profitability conditions and have strongly stimulated milk production in the cattle breeding and rearing areas which are remote from consumption centers. This has led to a surplus production of milk and to difficulties on the butter market.

Breeding necessarily involves the production of milk, especially since almost all Austrian breeds have accumulated a relatively high genetic capacity for milk production and since pure meat-type breeds are absent. In the past, a somewhat lower milk price in remote regions probably stimulated the utilization of milk for livestock feed while at the same time the supply of milk to the dairies rose at a smaller rate than under the uniform

Table 79. – Indexes of cow numbers, of milk production, milk consumption, and milk yields per cow, by Federal Provinces, specified years, 1937-59, Austria
(1937 = 100)

Year	Lower Austria incl. Vienna	Burgenland	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
Cow numbers								
1937	100	100	100	100	100	100	100	100
1951	84	94	99	97	95	92	95	104
1955	88	95	101	101	102	100	100	100
1959	82	85	99	101	99	95	97	103
Milk yields per cow								
1937	100	100	100	100	100	100	100	100
1951	99	98	100	120	103	108	122	117
1955	107	110	104	119	110	111	130	116
1959	113	125	127	133	125	126	142	132
Total milk production								
1937	100	100	100	100	100	100	100	100
1951	79	89	98	127	103	109	120	111
1955	91	101	107	132	118	114	128	106
1959	90	106	127	148	132	128	138	120
Supply of milk to dairies and other consumers								
1937	100	100	100	100	100	100	100	100
1951	62	59	74	81	83	77	77	88
1955	80	95	86	93	117	89	90	91
1959	77	104	114	123	135	114	107	108
Milk consumption of farm households								
1937	100	100	100	100	100	100	100	100
1951	99	125	116	213	112	127	156	103
1955	105	127	144	269	112	118	182	123
1959	99	121	146	245	126	123	182	117
Milk consumption for livestock feeding								
1937	100	100	100	100	100	100	100	100
1951	120	92	132	116	125	165	177	194
1955	129	77	137	110	129	166	165	183
1959	142	87	154	122	135	176	162	224

milk price level. This intensified the rearing of calves, the extent of calf-fattening, and the production of cattle for fattening on domestic beef farms, as well as production of high quality slaughter cattle for foreign markets. The Government, however, wishes to maintain the uniform milk price level for the whole federal territory in order to protect the alpine farms which derive their main income from cattle and dairy farming. The system of different prices for fresh whole milk and for industrial milk which has been suggested for the agricultural market within the EEC has been rejected by the Conference of the Presidents of Austrian Chambers of Agriculture in the statement on European integration of March 1960.

The rate of livestock turnover has been accelerating considerably. This increased the number of slaughterings and the market supply of meat. Statistics available on slaughterings are recorded with accuracy. Farm slaughterings are generally not subject to veterinary inspection and are therefore not statistically ascertained. They have to be estimated by the Central Statistical Office, but the errors of estimation are probably not large. With the exception of horses and sheep, slaughterings increased sharply after the decline caused by the war. Average slaughtering weights have risen also due to improved feeding methods (table 80). At the present time they are much higher than before the war. In 1937 and up to 1952, more oxen than bulls were slaughtered, but at present the number of bulls slaughtered is larger because they develop more quickly, make better use of feed, and show larger increases in weight. 30/ While the supply of cattle for slaughter has exceeded domestic demand for years (the surplus is exported), calves for slaughter are scarce because of the steadily growing proportion of the calf crop reared for beef and milk production.

Along with the rise in slaughter weights, the meat-fat ratio has changed in favor of meat, and carcass quality has improved. Proposals to increase the weight of calves raised for veal has not been realized. In spite of rising prices for veal it is still more profitable to sell milk to the dairies than to use it for finishing veal calves.

Total meat production (including slaughtering fats) is obtained from commercial slaughterings, farm slaughterings, and average slaughter weights as well as from the foreign trade in slaughter animals. Furthermore, exports of animals other than for slaughter are included, and allowance was also made for inventory changes in the stock of animals (expressed as meat equivalent in both cases).

According to the "Long-Term-Program 1949-50 vis 1952-53," annual meat production in 1934-38 amounted to 321,000 tons; the share of beef and veal amounted to 98,000 tons (31 percent), and that of pork to 199,000 tons (62 percent). Prior to 1938, slaughterings were not recorded statistically. The remaining 24,000 tons (7 percent) includes the meat of horses, sheep, goats, rabbits, and poultry. If the meat equivalent of the exports of animals other than for slaughter is added, total meat production (including slaughtering fats) amounted to 324,000 tons (table 81).

30/ Oxen fatten at a slower rate and require a higher feed input for each kilogram of weight gain than young bulls (F. Haring, "Fleischerzeugung beim Rind", Der Tierzüchter, No. 24, Vol. 1959).

Table 80. – Livestock slaughterings and slaughter weights, by types of livestock, specified periods, 1934-38 – 1960, Austria

Year or period	Oxen	Bulls	Cows	Heifers	Calves	Hogs		Horses	Sheep 2/	Goats 3/
						Commer-cial	Farm			
					(1,000 head)					
Slaughtered animals:										
1934-38										
ave. 1/	82.2	42.9	165.0	39.6	450.5	1,314.1	950.0	24.8	52.5	49.0
1949 1/	58.9	37.5	139.2	32.1	411.8	715.7	702.2	17.9	90.5	76.2
1950	58.1	41.1	147.6	38.3	441.5	855.5	850.6	20.7	82.5	64.0
1951	61.1	46.5	181.0	42.7	474.8	1,004.2	753.1	25.6	92.5	60.0
1952	59.8	54.7	169.4	44.1	484.4	1,141.8	905.2	20.7	79.7	65.0
1953	66.4	73.6	175.0	46.0	561.9	1,317.7	889.9	21.8	79.3	-
1954	61.2	74.8	182.5	47.0	542.9	1,295.0	850.0	24.4	78.6	64.0
1955	56.8	73.9	176.0	44.7	533.3	1,458.8	889.1	20.5	76.9	60.0
1956	53.3	82.5	183.5	48.8	525.6	1,593.0	858.3	23.8	108.0	80.0
1957	48.2	91.1	177.9	53.1	540.8	1,655.5	883.2	24.3	89.3	91.4
1958	40.5	91.3	183.2	56.0	521.4	1,820.3	885.0	20.7	66.2	81.7
1959	36.4	105.3	183.2	47.7	467.3	1,812.1	871.7	18.0	38.9	67.2
1960 4/	35.5	121.1	--- 210.3 ---		446.1	1,954.2	881.9	16.6	-	-

Table 80. - Livestock slaughterings and slaughter weights, by types of livestock, specified periods, 1934-38 - 1960, Austria - Continued

Year or period	Oxen	Bulls	Cows	Heifers	Calves	Hogs		Horses	Sheep 2/	Goats 3/
						Commer-cial	Farm			
					(Kilograms)					
Average slaughter weights per animal:										
1934-38										
av. 1/	307	291	217	198	46	74	108	206	20	20
1949 1/	250	230	205	180	40	75	90	161	20	20
1950	307	291	217	198	46	74	108	206	20	20
1951	306	290	217	197	47	78	112	-	21	20
1952	312	296	216	203	49	81	110	206	28	20
1953	313	287	222	202	48	83	105	208	23	20
1954	320	295	219	208	51	82	108	226	24	21
1955	322	299	224	209	45	81	107	227	23	20
1956	325	302	222	207	44	80	110	242	24	20
1957	332	311	233	222	43	80	103	240	23	20
1958	329	316	236	226	45	81	103	240	23	20
1959	326	324	235	229	44	83	99	248	23	20
1960 4/	331	317	242	233	47	83	102	255	23	17

1/ Calculation of the Institute.
2/ Excluding lambs.
3/ Excluding kids.
4/ Preliminary figures.

Source: Central Statistical Office.

After the war, meat production (excluding inventory changes in livestock numbers) decreased more than milk production because much of the potential meat output was required to rebuild the stock. In 1949, meat production was 38 percent below the average for 1934-38, and milk production was 26 percent below the level for this same period. As in the case of milk production, the output of meat had not fully reached its prewar level by 1952, but had surpassed it in 1953. Until 1953, animals ready for slaughter were a small proportion of the total stock of animals, i. e., meat production in relation to total animal stock was low. 31/ In 1960, the level of meat production amounted to 419,000 tons, that is 29 percent more than in 1934-38 and 52 percent above 1951. The share of beef and veal in total meat production (32 percent) was somewhat bigger and that of pork (60 percent) was smaller than in 1934-38. The export of animals other than for slaughter had risen to more than three times the prewar level.

For a long time after the war there had been a disproportion between livestock numbers and the volume of feed input. This put a restraint on animal productivity, especially because draft animals got better feed in order to secure their full draft power. Due to the replacement of some draft animals by tractors, the efficiency of animal production has increased. Feed-stuffs which previously had been required by draft animals were released for breeding animals and animals for slaughter. Moreover, feed grains and protein feeds were imported in sufficient quantities, domestic feed production was raised, and at the same time the stock of animals declined.

The improved feed supply situation together with the decrease of animal draft power, the breeding of fast growing strains, and the faster rate of turnover all account for a significant rise in the meat yield per head of cattle and per hog. Yields increased from 39 kilograms per head of cattle in 1934-38 to 67 kilograms in 1960, and from 69 kilograms per hog to 90 kilograms (table 82). These estimates take into account, apart from the number of slaughterings, the export of animals other than for slaughter, as well as the inventory changes in the stock of animals (in meat equivalent). The rising yields per animal have lowered production costs since they reduce fixed costs (maintenance feed, wages, rent for stables, material for bedding) per unit of physical product.

Domestic production of meat from horses, sheep, goats, rabbits, and poultry amounted to some 24,000 tons in 1934-38, to 12,000 tons in 1951, and is estimated at 24,000 tons of meat in 1960 (table 83). The domestic supply of horses for slaughter does not satisfy demand. From a total of 31,900 horses slaughtered in 1960 (8,141 tons of meat), 52 percent were supplied by domestic producers and 48 percent were imported. The production of poultry meat has risen sharply in the past years, but could not keep pace with the rapidly growing demand. According to the food balance figures, 19,500 tons of poultry meat were consumed in 1959/60; about 14,000 tons were supplied from domestic sources and 5,500 tons were imported. Out of these imports, 1,800 tons were admitted duty free. On the basis of an agreement between the Chambers of Commerce, of Labor, and of Agriculture, in addition to the duty-free quota (1,800 tons), poultry for slaughter may be imported at reduced tariffs if domestic supply is limited. The special tariff does not apply to broilers and young poultry. The import of fattened hens is not permitted between September 15 and November 15.

31/ Investigations in Germany have shown that an increase of the animal stock by 250,000 head of cattle plus 1 million hogs takes about 40,000 tons of carcass weight out of production. See "Wochenerricht des Deutschen Institutes für Wirtschaftsforschung," No. 15, Vol. 1950, p. 62.

Table 81. – Meat production and related data, specified years, 1934-60, Austria
(1,000 tons)

Year	Production from slaughterings 1/				Export of animals other than for slaughter 2/	Total meat production	
	Beef and veal	Pork	Other meat	Total		Excluding inventory changes in livestock numbers	Including inventory changes in cattle and pig numbers
1934-38	98.0	199.0	24.0	321.0	3.0	324.0	324.0
1949	70.6	113.0	16.0	199.6	0.5	200.1	226.9
1950	89.7	155.1	10.7	255.5	3.0	258.5	305.0
1951	102.1	160.6	11.8	274.5	1.5	276.0	274.8
1952	104.3	192.1	12.3	308.7	0.9	309.6	338.4
1953	121.4	202.8	16.6	340.8	2.5	343.3	336.9
1954	124.7	199.5	17.5	341.7	2.4	344.1	343.3
1955	114.6	213.5	19.5	347.6	1.7	349.3	350.5
1956	122.7	222.2	24.1	369.0	5.3	374.3	370.4
1957	130.5	223.4	24.0	377.9	9.4	387.3	386.8
1958	136.0	241.2	23.6	400.8	8.2	409.0	392.8
1959	135.7	236.8	24.3	396.8	8.6	405.4	401.5
1960 3/	135.6	250.2	24.3	410.1	9.4	419.5	436.8

1/ Meat equivalent, including slaughtering fats.
2/ Meat equivalent equals 50 percent of live weight.
3/ Preliminary figures.

Egg production was estimated at 716 million in 1934-38, at 670 million in 1951, and at 1,170 million in 1960 (table 84). Production per hen amounts to 86, 115, and 133 eggs in the three above periods. The apparent yields of 123 and 118 eggs per hen in 1949 and 1950 are probably somewhat too high because during the period of food rationing the statistics on poultry numbers were incomplete and, therefore, very unreliable. On the other hand, the output of 114 eggs per hen in 1955 and 1956 seems to be underestimated.

Most farms had neglected poultry production for a long time. Recently, however, there has been a renewed upswing in poultry production because of the increasing scarcity and rising prices of veal. Farmers now emphasize breeds with a high productive capacity for eggs or for meat, and pay attention to a fast rate of turnover. Chicks are supplied by hatcheries and subsidies are granted for the construction of modern breeding and housing facilities.

Table 82. – Meat yield per head of cattle and per hog and related data, specified years, 1934-1960, Austria

Year	Animal numbers 1/ (1,000 head)	Meat production			Meat yield per head (Kilograms)
		Slaughterings 2/ (1,000 tons)	Inventory changes 3/ (1,000 tons)	Total (1,000 tons)	
Cattle:					
1934-38	2,579	101.0	-	101.0	39.2
1949	2,109	71.1	15.1	86.2	40.9
1950	2,203	92.2	18.1	110.8	50.3
1951	2,281	103.6	- 1.6	102.0	44.7
1952	2,284	105.2	14.1	119.3	52.2
1953	2,347	123.9	- 6.9	117.0	49.9
1954	2,300	127.1	- 2.1	125.0	54.3
1955	2,304	116.3	- 9.6	106.7	46.3
1956	2,347	128.0	7.7	135.7	57.8
1957	2,325	139.9	- 7.0	132.9	57.2
1958	2,297	144.2	- 9.0	135.2	58.9
1959	2,279	144.3	- 1.6	143.7	63.1
1960 4/	2,308	145.0	10.7	155.7	67.4
Hogs:					
1934-38	2,868	199.0	-	199.0	69.4
1949	1,618	113.0	11.7	124.7	77.1
1950	1,927	155.1	28.4	183.5	95.2
1951	2,523	160.6	0.4	161.0	63.8
1952	2,448	192.1	14.7	206.8	84.5
1953	2,701	202.8	0.5	203.3	75.3
1954	2,643	199.5	1.3	200.8	76.0
1955	2,803	213.5	10.8	224.3	80.0
1956	2,933	222.2	-11.6	210.6	71.8
1957	2,727	223.4	6.5	229.2	84.3
1958	2,917	241.2	- 7.2	234.0	80.2
1959	2,838	236.8	- 3.3	233.5	82.3
1960 4/	2,845	250.2	6.6	256.8	90.3

1/ Refers to December of preceding year; cattle include calves.
2/ Including export of animals other than for slaughter as meat equivalent.
3/ Meat equivalent.
4/ Preliminary figures.

Table 83. - Production of meat from horses, sheep, goats, rabbits, and poultry, specified years, 1934-60, Austria

Year	Meat production (in 1,000 tons)						
	Horses	Sheep	Goats	Rabbits	Chicken	Other poultry	Total
1934-38	-	-	-	2.1	--- 4.4 ---		24.0
1949	-	-	-	1.3	--- 2.4 ---		16.0
1950	4.3	1.7	1.3	0.8	2.4	0.3	10.7
1951	5.2	2.0	1.2	0.8	2.4	0.3	11.8
1952	4.3	2.2	1.3	1.0	3.2	0.3	12.3
1953	4.5	2.8	2.7	1.0	4.6	0.9	16.6
1954	5.5	3.0	2.9	1.0	4.2	0.8	17.5
1955	4.7	2.8	2.5	1.0	7.6	1.0	19.5
1956	5.8	3.2	3.3	0.8	9.8	1.2	24.1
1957	5.8	2.6	2.7	1.0	10.7	1.0	24.0
1958	5.0	2.7	2.5	1.0	11.4	1.0	23.6
1959	4.5	2.2	2.0	1.0	13.8	0.8	24.3
1960 1/	-	-	-	-	-	-	24.3

1/ Preliminary figures.

Table 84. - Chicken and egg production, specified years, 1934-1960, Austria

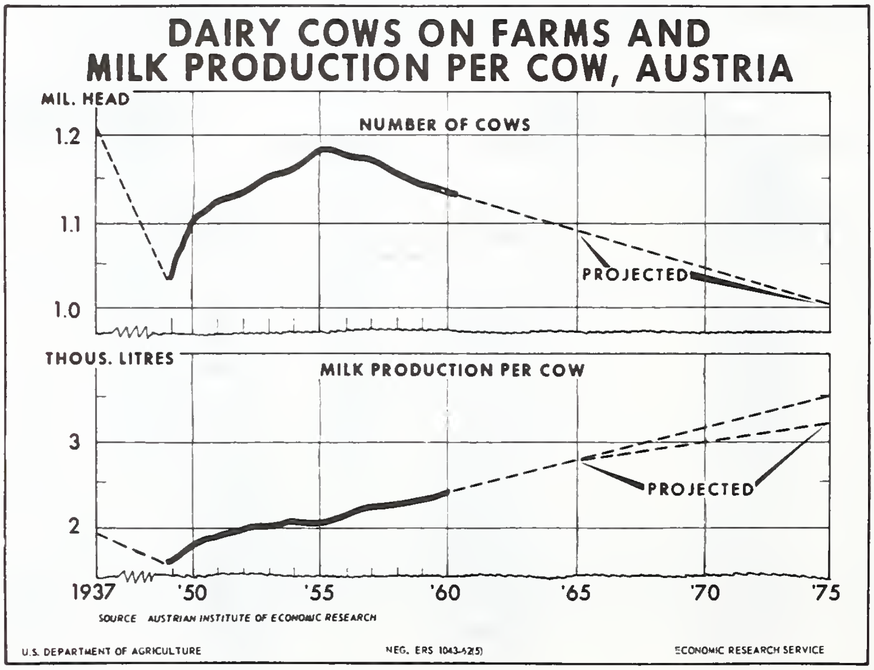
Year or period	Chicken production		Egg Production	
	Total number 1/ (1,000 head)	Hens (1,000 head)	Total (million)	Eggs per hen
1934-38 av.	9,046	8,292	715	86
1949	3,892	3,136	387	123
1950	4,886	4,104	486	118
1951	6,661	5,824	670	115
1952	6,920	6,091	720	118
1953	7,674	6,882	801	117
1954	8,218	7,370	879	119
1955	8,946	8,336	950	114
1957	9,070	8,426	1,003	119
1958	9,412	8,710	1,076	124
1959	9,503	8,643	1,152	133
1960 2/	9,797	8,819	1,170	133

1/ Refers to December of preceding year.
2/ Preliminary figures.

2.2 Projected output of livestock products until 1975

Projections of livestock output are based on expected livestock numbers as described in Section 1 of this chapter and on graphical extrapolations of the historical development of yields per animal. It was generally assumed that livestock productivity will increase until 1965 at about the same annual rates as it did in recent years. Two estimates have been developed for 1975; (1) Projection A based on the same growth rates as were applied for 1960-65, and (2) projection B estimated under the assumption of slightly smaller values. Growth rates are assumed constant within the periods.

The details of the projections are presented in table 85 and are summarized as follows: The number of milking cows (1.13 million head in 1960) is expected to decrease to 1.08 million by 1965 (annual decrease of 10,000 head), and to 1.00 million by 1975 (annual decrease of 8,000 head). The milk yield per cow (2,512 kilograms in 1960) is projected to rise to 2,850 kilograms by 1965 (annual increase of 67.6 kilograms). The 1975 yield is 3,600 kilograms according to Projection A and 3,300 kilograms according to Projection B. (See fig. 28 for trends and projections for milk.) Total milk production in 1965 will amount to 3.09 million tons, that is, 9 percent more than in 1960 and 30 percent more than in 1937. By 1975, total milk production is expected to reach 3.60 million tons according to Projection A, which means a rise of 17 percent above the 1965 level (27 percent above 1960 and 52 percent above 1937). According to Projection B, total milk production is expected to amount to 3.30 million tons in 1975, that is, 7 percent more than in 1965 (16 percent above 1960 and 39 percent above 1937).



SOURCE AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1043-62(5) ECONOMIC RESEARCH SERVICE

Figure 28

The level of milk productivity in Austria (which is relatively low in comparison with other European countries) lends support to Projection A. The point of inflection on the yield curve which marks the beginning of diminishing marginal returns probably lies above the estimated level of 1965 (2,850 kilograms of milk). The projected milk yield of 3,600 kilograms in 1975 is lower than the yield achieved in Denmark in 1959. Projection B could be realized if progress in breeding and feed production is slower in the future than it has been in the past, which, however, is very unlikely. A milk yield of 3,300 kilograms per cow in 1975 would only be equal to the 1959 level in the German Federal Republic.

Despite rising per capita demand for milk and dairy products, total consumption in farm households will decrease slightly due to the decline of the farm population. Consumption is estimated at 760,000 tons in 1965 and 750,000 tons in 1975, compared with 766,000 tons in 1960. The use of milk for feed, however, will rise from 553,000 tons in 1960 to approximately 595,000 tons in 1965 and to 680,000 tons in 1975, due to the expected increase in the proportion of animals raised for breeding and slaughter. The market supply of milk (production minus farm disappearance) will, therefore, amount to 1.72 million tons in 1965 and to 2.17 million tons (Projection A) or 1.87 million tons (Projection B) in 1975. Part of the market supply will be used as fresh whole milk; the rest will be processed for dairy products.

For beef and pork production, the following estimates were derived. Cattle will remain at 2.40 million head and hogs will amount to 3.00 million in 1965 and to 3.05 million in 1975 (table 86). At the same time, according to the graphical extrapolation, the meat yield per head of cattle will rise from 67.4 kilograms in 1960 to 76.0 kilograms in 1965, and in 1975 to 93.0 kilograms (Projection A) or 87.0 kilograms (Projection B) (fig. 29). The meat yield per hog will rise from 90.3 kilograms to 97.0 kilograms to 110.0 kilograms (Projection A) or 105.0 kilograms (Projection B). The resulting production figures for 1965 will amount to 182,000 tons of beef and veal (including exports of cattle other than for slaughter) and 291,000 tons of pork (17 percent and 13 percent, respectively, above 1960). By 1975, production of beef and veal is expected to rise to 223,000 tons and that of pork to 335,000 tons according to Projection A (22 percent and 15 percent above 1965). According to Projection B, about 208,000 tons of beef and veal and 320,000 tons of pork will be produced in 1975 (14 percent and 10 percent above 1965). These calculations refer to carcass weights and comprise meat as well as slaughtering fats (tallow and lard).

The production of other meat is estimated at 27,000 tons in 1965 and at 29,200 tons in 1975 compared with 24,300 tons in 1960. Due to the decline in the number of horses as well as sheep and goats, slaughterings will also decrease, and production in 1965 and 1975 will amount to about 7,500 tons and 5,500 tons. Poultry meat production, on the other hand, will reach approximately 19,500 tons in 1965 and 23,700 tons in 1975. Total meat production (including lard and tallow), therefore, may amount to about 500,000 tons in 1965, and in 1975 it is expected to range between 558,000 tons (Projection B) and 588,000 tons (Projection A). This would imply a rise of the output index (1934-38 = 100) from 135 in 1960 to 154 in 1965, and between 172 and 181 in 1975. In 1965, production would then be 15 percent above the 1960 level, and by 1975 between 12 percent and 18 percent above the level of 1965.

Table 85. – Projected milk production and disappearance until 1975, Austria 1/

Year	Stock of milking cows (1,000 head)	Milk yield per cow (kilograms)	Total milk production (1,000 tons)	Farm consumption		Market supply (1,000 tons)	Indices of milk production		
				Households (1,000 tons)	Feeding (1,000 tons)		1937 = 100	1960 = 100	1965 = 100
1960	1,131	2,512	2,842	766	553	1,522	120.0	100.0	-
1965	1,080	2,850	3,087	760	595	1,723	130.3	108.6	100.0
1975 A	1,000	3,600	3,600	750	680	2,170	152.0	126.7	116.6
1975 B	1,000	3,300	3,300	750	680	1,870	139.3	116.1	106.9

1/ Projections of the Institute. The approximately linear curve reflecting milk yields per cow from 1951 to 1960 was graphically extended until 1965 and until 1975 (Projection A). Projection B assumes a flattening of the yield curve in the period from 1965 to 1975. It was further assumed that the stock of milking cows will decrease until 1965 by 10,000 head annually as it did from 1955 to 1960, and by 8,000 head from 1965 to 1975. The increased demand for milk for feeding will be caused by the growing proportion of calves raised for beef and milk production.

Table 86. – Projected meat production and related data until 1975, Austria 1/

Year	Stock of		Meat yield per head		Meat production				Indices of meat production		
	Cattle (1,000 head)	Hogs (1,000 head)	Cattle (Kilo- grams)	Hogs (Kilo- grams)	Beef and veal (1,000 tons)	Pork (1,000 tons)	Other meat (1,000 tons)	Total (1,000 tons)	1934/38 =100	1960 =100	1965 =100
1960	2/2,308	2/2,845	67.4	90.3	155.7	256.8	24.3	436.8	134.8	-	-
1965	2,400	3,000	76.0	97.0	182.4	291.0	27.0	500.4	154.4	114.5	-
1975 A	2,400	3,050	93.0	110.0	223.2	335.5	29.2	587.9	181.5	134.6	117.5
1975 B	2,400	3,050	87.0	105.0	208.8	320.3	29.2	558.3	172.3	127.8	111.6

1/ Projections of the Institute. The average growth of meat yields per head of cattle and per hog calculated for the period 1951-60 has been extrapolated graphically until 1965 and until 1975 (Projection A). Projection B is based on lower rates of growth during the period 1965-75.

2/ Refers to December 1959.

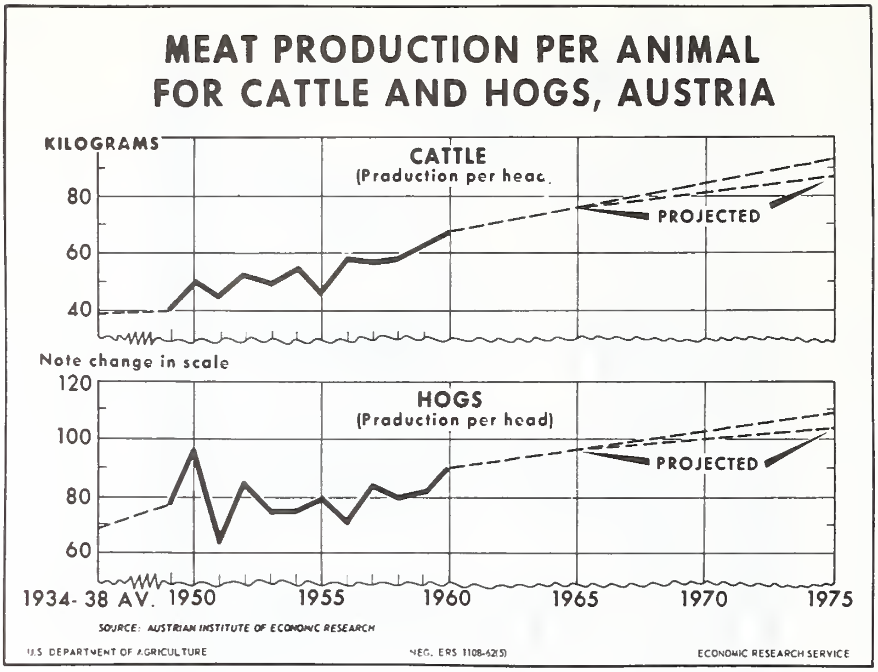


Figure 29

Because of unreliable statistics on the stock of chicken the future production of eggs can only be estimated very roughly. It has been assumed that poultry numbers will rise from 9.80 million in 1960 to 10.80 million in 1965 and 12.00 million in 1975, and that of hens from 8.82 million to 9.70 million and 10.80 million (table 87). The yields per hen may increase from 133 to 140 and 150 eggs. Total production will, therefore, rise from 1.17 billion eggs in 1960 to 1.36 billion in 1965 and 1.62 billion in 1975; the production index (1934-38 = 100) from 164 to 190 and 227. Production in 1965 would then be 16 percent higher than in 1960, and in 1975 19 percent higher than in 1965.

2.3 Value and productivity of livestock production

In 1960 total value of production of cow's milk, meat, and eggs (at producer's prices of 1952-56) amounted to AS 12.17 billion and was 31 percent above the average level in 1934-38 (table 88). The value is expected to rise to AS 13.70 billion by 1965, an increase of 13 percent. It will then be 48 percent above the prewar level. In 1975, the value of total animal production is expected to range from AS 15.15 billion (Projection B) to AS 16.12 billion (Projection A), which means an increase of between 11 and 18 percent above the 1965 level and a rise of between 63 and 74 percent above the level in 1934-38.

The productivity of livestock production may be calculated by relating the total value of production to the respective stock of animals (both valued at prices of 1952-56). In 1934-38, the value of animal products per AS 1,000 of animal stock value amounted to AS 720 and in 1960 to AS 1,080 (up 50 percent). In 1965, livestock products amounting to approximately AS 1,250 will be produced per AS 1,000 of animal stock value, and the volume of animal products may further increase by 1975 to AS 1,420 (Projection B) or to

AS 1,510 (Projection A) per AS 1,000 of animal stock value. This corresponds to an annual rate of increase of 2.97 percent from 1960 to 1965, and of 1.91 percent (Projection A) or 1.28 percent (Projection B) from 1965 to 1975. In the period from 1934-38 to 1960, the rate of increase was 1.70 percent.

Table 87. — Projected egg production for 1975, Austria

Year	Chickens 1/		Egg production		Indices of egg production		
	Total number (1,000 head)	Hens (1,000 birds)	Eggs per hen	Total (Million)	1934-38 =100	1960 =100	1965 =100
1960 2/	9,797	8,819	133	1,170	163.6	-	-
1965	10,800	9,700	140	1,358	189.9	116.1	-
1975	12,000	10,800	150	1,620	226.6	138.5	119.3

1/ Refers to December of preceding year.
2/ Preliminary figures.

Table 88. — Value of livestock production, specified periods since 1934 and projections for 1965 and 1975, Austria 1/

Year	Value of production at producer's prices, 1952-56 (million schillings)						Indices of livestock production		
	Cow milk	Beef and veal 2/	Pork 3/	Other meat	Eggs	Total	1934-38 =100	1960 =100	1965 =100
1934-38	3,767	1,650	2,971	276	608	9,272	-	-	-
1957	4,344	2,172	3,432	276	853	11,077	119.5	-	-
1958	4,376	2,209	3,494	271	915	11,265	121.5	-	-
1959	4,415	2,348	3,486	279	979	11,507	124.1	-	-
1960	4,519	2,544	3,834	279	995	12,171	131.3	—	—
1965	4,908	2,980	4,345	310	1,154	13,697	147.7	112.5	-
1975 A	5,724	3,677	5,009	336	1,377	16,123	173.9	132.5	117.7
1975 B	5,247	3,412	4,782	336	1,377	15,154	163.4	124.5	110.6

1/ Calculation of the Institute.

2/ Including exports of animals for slaughter, for breeding and other purposes (meat equivalent), as well as in the inventory changes in livestock numbers.

3/ Including inventory changes in hog numbers.

VI. AGRICULTURAL PRODUCTS: FEED BALANCE, FEED REQUIREMENTS, AND THE FUTURE DEMAND FOR FEEDSTUFFS

The present chapter will investigate the feed balance, the feed requirements, and the future import demand for feedstuffs. These components are expressed in the alternative ways of (1) digestible protein, (2) starch equivalent, and (3) the grain equivalent in feeding value.

The total domestic feed production was computed from estimates of yields of numerous crops, minus the quantities used for seeds, lost in storage, and used either for direct human consumption or for industrial purposes. The crops of interest are those used directly for feeds such as (1) grains, (2) certain of the row crops, (3) pasture, and (4) grasses and clovers cut for green feed. To these have to be added the quantities of whole and skim milk fed to calves and pigs and byproducts of the milking, sugar, fat, and dairy industries which are made into commercial feeds. As was indicated in Chapter IV, it is very difficult to estimate yields of pasture lands and of areas of grasses and clovers cut for feed; altogether the sources of errors are many and great. Similarly, it is difficult to estimate future feed consumption. Nevertheless, in spite of the difficulties which are involved, the estimated aggregates give valuable indications of future production, consumption, and import demand for feedstuffs.

Much of the computations needed for projections in regard to feedstuffs were based on the estimates of total crop production in Chapter IV. The quantities of bread and coarse grains, potatoes, pulses, and of milk fed to animals, were derived from official food balance sheets. Figures for calendar years were obtained by averaging the data of the respective crop years. The input of other feeds was taken from the national income accounts (value added by agriculture and forestry) and from foreign trade statistics. Allowance was made for losses due to storage based on the assumption of 10 percent each for fodder beets, green forage, and hay. The feed intake of cattle raised on alpine pasture was calculated on the basis of the figures given in the "Alps Statistics 1957," which led to an estimate of 23,600 tons of digestible proteins and 177,200 tons of starch equivalent (corresponding to 500,000 tons of good-quality hay). About 393,832 cow-units were kept on alpine pastures for 100 days per year, according to the Alps Statistics report. Based on accepted feeding standards for 5 liters of milk produced on the average per day (or a corresponding gain in weight for non-milking cattle), each of the 393,832 cow-units may be assumed to have a daily feed requirement of 300 grams of proteins (half for maintenance and half for production) and 4,500 grams of starch equivalent (3,000 grams for maintenance and 1,500 for production).

1. Feed Requirements and Import Demand for Feedstuff from 1937 to 1959

To develop a realistic estimate of total feed requirements, the official data on agricultural land use had to be adjusted. Agricultural statistics cover only changes in arable land, vineyards, and alpine pastures. Adjustments were made on the basis of the data presented in table 89. The forest area was held constant at 3.14 million hectares since 1934-38, and the remaining area was allotted to meadows (154,000 hectares added) and unproductive areas (219,000 hectares added).

Actually, the forest area amounted to 3.35 million hectares in 1952-56 according to the forest census, and probably has been extended to 3.37 million hectares since then. Since the areas of meadows and unproductive land have been calculated as a residual, the respective figures as published by the Central Statistical Office are likely overestimated. If it is assumed that some 110,000 hectares have been withdrawn from agriculture since 1937, the land under meadows in 1960 probably amounted to about 990,000 hectares - almost 130,000 hectares (or 11.5 percent) less than the area indicated by the Central Statistical Office. Land was withdrawn for purposes of establishing military training areas during the war, extending industrial areas, and increasing residential housing sites. Since the change in the pattern of agricultural land was gradual, the discrepancy in area mentioned above was distributed over the period from 1934-38 to 1960 at about 0.5 percent per annum. The production of hay may be adjusted in a similar manner. Accordingly, the quantity of hay harvested was adjusted by reducing the official data on total production by 11.5 percent for 1960, 11 percent for 1959, 10.5 percent for 1958, etc. Fallow land could not be taken account of due to the lack of statistical data. Moreover, as a consequence of labor shortage, remote and steep meadows in the mountains are no longer utilized. In the agricultural statistics, however, these areas continue to be classified as agricultural land.

Calculation of total feed requirements shows that, on the average for the period 1934-38, the total annual quantity of available feedstuffs contained 0.49 million tons (or 4,868,000 quintals) of digestible protein or 3.56 million tons (or 35,636,000 quintals) of starch equivalent. According to similar calculations worked out by the Federal Ministry of Agriculture and Forestry in 1949 (Long-Term Program), total annual feed supply for the period 1926-35 was estimated at 0.46 million ton of digestible protein in 3.62 million tons of starch equivalent. From 1949-50 to 1952-53, total annual supply amounted to 0.44 million ton of protein in 3.47 million tons of starch equivalent. Immediately after the war, the supply of feeds was limited and the shortage of foreign exchange permitted only small imports. In 1949, the supply of protein was 18 percent smaller than before the war and that of starch equivalent was 21 percent smaller. Since then, consumption of feedstuffs rose sharply. In 1959 as well as on the 1955-59 average, 0.53 million ton of protein and 3.94 million tons of starch equivalent were used (9 percent and 11 percent more than in 1934-38 respectively). Total feed consumption based on the average of the period 1934-38 and its development since 1949 is shown in table 90. Table 91 presents the distribution according to kinds of feed on the average for the periods 1934-38, 1950-54, and 1955-59, respectively.

Domestic livestock production, particularly hog and poultry raising, depends to a considerable extent on feed imports. Imported in large quantities are such feedstuffs as coarse grains, bran, feeding meal, fish and meat meal as well as oilcake. This is illustrated in tables 92 and 93 which show data on feed imports from 1937 to 1959. After the war, imports had to be severely restricted. In 1949, the production value of imported feedstuffs amounted to only 21,400 tons of protein and 141,000 tons of starch equivalent, about 63 percent and 64 percent less than in 1937 (see table 92). By 1952, imports increased rapidly and remained at that level (with strong annual fluctuations) until 1959. On the 1955-59 average, imported feedstuffs contained 53,000 tons of protein or 365,700 tons of starch equivalent - only about 8 percent and 7 percent less than in 1937. The imported quantities of coarse grains (458,400 tons) as well as of fish and meat meal (16,900 tons) were already larger than before the war (up 12 percent and up 99 percent). On the other hand, imports of oilcake (28,000 tons against 103,700 tons) were lower in 1937.

Table 89. – Utilization of the total land area of Austria, three specified periods

Type of land use	According to official statistics				Estimates based on the forest census 1952-56	
	1934/38		1960			
	1,000 hectares	Percent	1,000 hectares	Percent	1,000 hectares	Percent
Arable land	1,961	24	1,647	20	1,647	20
Gardens and vineyards 1/	133	2	107	1	107	1
Meadows	965	11	1,119	14	990	12
Alpine and other pastures	1,285	15	1,179	14	1,179	14
Agricultural area	4,344	52	4,052	49	3,923	47
Forests	3,145	37	3,142	38	3,370	40
Unproductive land	893	11	1,112	13	1,013	13
Total land area	8,382	100	8,306	100	8,306	100

1/ Includes land under crop trees and nurseries.

Table 90. – Estimated total feed consumption in terms of digestible protein and starch equivalent as well as grain equivalent, specified periods 1934-1959, Austria 1/

Year	Digestible protein		Starch equivalent		Grain equivalent 2/
	1,000 quintals	Index	1,000 quintals	Index	1,000 quintals
1934/38 av.	4,868	100	35,636	100	49,494
1949	3,991	82	28,029	79	38,929
1950	3,994	82	29,210	82	40,569
1951	3,254	87	30,568	86	42,456
1952	4,304	88	30,713	86	42,657
1953	4,748	98	34,822	98	48,364
1954	5,012	103	36,687	103	50,954
1955	5,309	109	38,450	108	53,403
1956	5,316	109	39,331	110	54,626
1957	5,345	110	39,780	112	55,250
1958	5,426	111	40,364	113	56,061
1959	5,309	109	39,392	111	54,711
1950/54 av.	4,462	92	32,400	91	45,000
1955/59 av.	5,322	109	39,445	111	54,784

1/ Calculations of the Institute

2/ Grain equivalent equals 1.39 times starch equivalent.

Table 91. – Consumption of various kinds of feedstuffs, 1934-38, 1950-54, and 1955-59, Austria 1/

Kind of feed	Content per 100 kilograms		1934-38 Average			1950-54 Average			1955-59 Average		
	Digestible protein (Kilograms)	Starch equivalent (Kilograms)	Quantity consumed (1,000 tons)	Digestible protein (1,000 tons)	Starch equivalent (1,000 tons)	Quantity consumed (1,000 tons)	Digestible protein (1,000 tons)	Starch equivalent (1,000 tons)	Quantity consumed (1,000 tons)	Digestible protein (1,000 tons)	Starch equivalent (1,000 tons)
Bread grain	9.5	70	83	7.9	58.1	92	8.8	64.5	127	12.1	88.9
Coarse grain	7.0	70	1,117	78.2	781.9	806	56.4	564.3	1,051	73.6	735.7
Bran	10.0	47	187	18.7	87.9	143	14.3	67.4	161	16.1	75.8
Feeding meal	10.0	73	144	14.4	105.0	54	5.4	39.1	86	8.6	62.9
Potatoes	1.0	20	1,392	13.9	278.4	1,126	11.3	225.2	1,872	18.7	374.5
Pulses	19.0	66	6	1.1	4.0	3	0.6	2.0	2	0.3	1.1
Brewer's grains (dry)	14.0	50	20	2.8	10.0	22	3.1	10.9	32	4.5	16.0
Malt germs	14.0	40	3	0.4	1.2	4	0.6	1.7	6	0.8	2.4
Fish and meat meal	55.0	70	8	4.4	5.6	7	4.1	5.2	17	7.3	11.8
Oilcake	30.0	70	61	18.3	42.7	43	12.8	29.8	41	12.4	29.0
Beet tops and leaves	1.7	9	1,071	18.2	96.4	1,132	19.3	102.0	1,323	22.5	119.1
Sugarbeet slices	0.5	7	339	1.7	23.7	310	1.6	21.7	505	2.5	33.2
Fodder beets	0.4	7	1,960	7.8	137.2	2,220	8.9	155.4	2,142	8.6	150.0
Green forage	0.8	8	1,322	10.6	105.8	1,026	8.2	82.1	1,338	10.7	106.9
Clover hay	7.0	30	1,317	92.2	395.1	1,228	85.9	368.3	1,387	97.1	416.1
Hay from meadows	4.0	32	3,552	142.1	1,136.6	4,057	162.3	1,298.4	4,877	195.1	1,560.5
Cow milk	3.2	17	385	12.3	65.5	423	13.5	71.9	471	15.1	80.2
Goat milk	3.1	16	70	2.2	11.2	75	2.3	11.9	60	1.9	9.6
Skim milk	4.0	10	400	16.0	40.0	391	15.7	39.1	488	19.5	48.8
Skim milk powder	33.5	50	–	–	–	–	–	–	2	0.7	1.0
Pasture 2/	–	–	–	23.6	177.2	–	23.6	177.2	–	23.6	177.2
Sub-total				486.8	3,563.6		458.7	3,338.1		551.7	4,100.7
Less: quantity of hay corresponding to the difference between official and actual meadow area 3/				–	–		12.5	98.1		19.5	156.2
Total				486.8	3,563.6		446.2	3,240.0		532.2	3,944.5
Index				100.0	100.0		91.7	90.9		109.3	110.7

1/ Calculations of the Institute; losses due to wastage were estimated at 30 percent for beet tops, 10 percent for fodder beets, 10 percent for green forage, 10 percent for hay, 10 percent for clover hay. 2/ According to Alps Statistics 1957. 3/ Due to shifts in the pattern of the agricultural land use (see comments in the text).

Table 92. – Total feed imports and the proportion of imports in total feed consumption, specified periods, 1937-59, Austria 1/

Year or period	Digestible protein 1,000 quintals	Starch equivalent 1,000 quintals	Grain equivalent 2/ 1,000 quintals	Percent of total feed consumption
1937	574.6	3,941.9	5,474.9	3/ 11.1
1949	214.0	1,414.4	1,964.4	4.8
1950	228.7	1,896.8	2,634.4	6.2
1951	361.9	2,595.7	3,605.1	8.5
1952	524.9	3,701.5	5,140.9	12.1
1953	391.4	2,493.6	3,463.3	7.2
1954	394.9	2,687.8	3,733.1	7.3
1955	612.9	4,246.7	5,898.2	11.0
1956	44.2	3,256.1	4,522.4	8.3
1957	551.7	3,866.2	5,369.7	9.7
1958	534.4	3,510.1	4,875.1	8.7
1959	512.3	3,408.1	4,733.5	8.7
1950/54 av.	380.4	2,675.1	3,715.4	8.3
1955/59 av.	531.1	3,657.4	5,079.8	9.3

1/ Calculations of the Austrian Institute; the following feedstuffs are included in the import figures: wheat, corn, milocorn, barley, oats, fish meal, meat meal, oilcake, bran, feeding meal, brewer's grains, and malt germs.

2/ Grain equivalent equals 1.39 times starch equivalent.

3/ Compared to total feed consumption on the 1934-38 average.

Table 93. – Imports of important feedstuffs, specified periods, 1937-59, Austria (1,000 quintals)

Year or period	Coarse grain	Bran and feeding meal	Fish and meat meal	Oilcake
1937	4,081.4	1,036.9	84.7	436.9
1949	1,765.3	0.2	55.8	199.2
1950	2,586.6	21.9	51.6	56.8
1951	3,309.7	42.6	61.6	306.2
1952	4,652.3	103.2	77.2	486.4
1953	3,020.8	6.9	73.1	463.1
1954	3,332.7	129.4	110.6	291.7
1955	5,263.4	230.3	154.9	450.6
1956	4,166.2	142.5	126.5	226.9
1957	4,866.1	156.7	157.3	360.4
1958	4,352.4	117.9	202.8	351.5
1959	4,271.0	93.6	202.4	308.8
1950/54 av.	3,380.4	60.8	74.8	320.8
1955/59 av.	4,583.8	148.2	168.8	280.2

Source: Foreign trade statistics.

Table 94. – Livestock production both in money and grain values, specified periods, 1934-1959, Austria 1/

Year or period	Grain equivalent 2/		At prices of 1952-56	
	1,000 quintals	Index (1934-38 = 100)	Million AS	Index (1934-38 = 100)
1934/38 av.	47,672	100	9,801	100
1949	34,623	73	7,074	72
1950	44,030	92	9,036	92
1951	41,739	100	8,586	88
1952	47,879	100	9,836	100
1953	48,171	101	9,983	102
1954	49,291	103	10,216	104
1955	50,881	107	10,544	108
1956	51,243	107	10,571	108
1957	54,432	114	11,285	115
1958	55,153	116	11,496	117
1959 3/	57,077	120	11,703	119
1950-54 av.	46,222	97	9,531	97
1955-59 av. 3/	53,757	113	11,120	113

1/ Calculations of the Institute; figures include milk used for feeding (according to "Food Balance Sheet" data) and hatching eggs (according to "National Income" reports).

2/ Input of the quantity of feed (grain equivalent = GE), which is necessary to achieve the output of 1 quintal of a certain animal product, e. g. : 1 quintal of hog (live weight) or 1 quintal of eggs = 5 quintals of GE (100 eggs = 0.25 GE); 1 quintal of cattle and sheep and poultry = 6 quintals of GE; 1 quintal of horse = 7 quintals of GE; 1 quintal of milk = 0.7 quintals of GE; and 1 quintal of raw wool = 40 quintals of GE.

3/ Preliminary figures.

Table 95. – Feed conversion rate, specified periods, 1934-1959, Austria 1/

Year or period	Feedstuffs required to achieve an output of animal products worth AS 1,000 (at average price of 1952—56)			Ratio of grain equivalent of livestock output to grain equivalent of feed consumption
	Digestible protein (quintals)	Starch equivalent (quintals)	Grain equivalent (quintals)	
1934-38 av.	0.50	3.64	5.05	0.96
1949	0.56	3.96	5.50	0.89
1950	0.44	3.23	4.49	1.09
1951	0.50	3.56	4.94	0.98
1952	0.44	3.12	4.34	1.12
1953	0.48	3.49	4.84	1.00
1954	0.49	3.59	4.99	0.97
1955	0.50	3.65	5.06	0.95
1956	0.50	3.72	5.17	0.94
1957	0.47	3.53	4.90	0.99
1958	0.47	3.51	4.88	0.98
1959	0.45	3.37	4.67	1.04
1950/54 av.	0.47	3.40	4.72	1.03
1955/59 av.	0.48	3.55	4.93	0.98

1/ Calculations of the Institute.

If consumption and imports of feedstuffs are uniformly expressed in grain equivalent (grain equivalent equals 1.39 starch equivalent), the calculation of the proportion of imports in total feed consumption shows that prior to World War II about 11 percent of total feed consumption was supplied by imports. In 1949, the share of imports had dropped to 4.8 percent due to import restrictions. In 1950-54 it had already increased to 8.3 percent, and in 1955-59 it amounted to 9.3 percent. This was almost the prewar level.

2. The Efficiency of Feed Conversion

In order to form an aggregate of "livestock production" containing the various animal products and to compare it with feed input, livestock products had to be converted to a common basis. For this purpose, "money values" and "grain values" may be adopted. [32]

The grain value of total annual livestock production amounted to 4.77 million tons in 1934-38, to 4.62 million tons in 1950-54, and to 5.38 million tons in 1955-59 (table 94). In the same periods, the values of all animal products at prices of 1952-56 were respectively AS 9.80 billion, AS 9.53 billion, and AS 11.12 billion. As seen from indices of grain values and money values (1934-38 = 100), the two have almost equal weights.

If the output of animal products (in money values or grain values) is compared with feed input (in terms of digestible protein and starch equivalent) the relative feed requirements can be measured. Before the war, the output of animal products worth As 1,000 (at average prices in 1952-56) required an input of 50 kilograms of digestible protein in 364 kilograms of starch equivalent (table 95). About 47 kilograms of protein in 340 kilograms of starch equivalent were required on the average for the period from 1950 to 1954. From 1955 to 1959, about 48 kilograms of protein in 355 kilograms of starch equivalent were required to produce an output of animal products worth AS 1,000. The corresponding grain values (grain value equals 1.39 times starch equivalent) amounted to 505 kilograms on the 1934-38 average, 472 kilograms on the 1950-54 average, and 493 kilograms on the 1955-59 average. The fluctuations in relative feed consumption are therefore very moderate, and the feed conversion rate has remained almost constant over very long periods of time. The calculations on the basis of grain values yield similar results. The quotient of animal production and feed consumption, both expressed in grain values, amounted to 0.96 in 1934-38, to 1.03 in 1950-54, and to 0.98 in 1955-59 (i. e., close to unity in all periods investigated). This adds credence to the reliability of the conversion into grain values (the calculated feed requirements are fairly accurate, in line with actual feed consumption).

The almost constant productivity of feed input is particularly striking because at the present time a smaller volume of feedstuffs than before the war is required for draft animals, allowing more feedstuffs to become available for milk and meat production. Also, the reduction of average age and the faster rate of turnover of animals as well as the rising milk, meat, and egg production per animal (declining proportion of maintenance feed) would lead to the expectation that the productivity of feed input has risen and fewer nutrients are required per unit of livestock output. A satisfactory explanation of the long-term constancy of feed conversion rates cannot be found. It is unlikely that an increasing output of animal products can be achieved only by progressively rising inputs. At least in milk production the law of diminishing returns does not yet seem to be effective. According to investigations by Huth, even for the 40th kilogram of milk, cows with a large productive capacity do not require more nutrients than for the 30th or 20th kilogram. 33/ The Austrian feed standard is 60 grams of digestible protein and 275 starch equivalents per kilogram of 4 percent milk. Only when the feeding level corresponding to the maximum productive capacity is exceeded do we find milk production ceasing to increase and the animals putting on weight instead.

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[32] For the computation on the basis of money values, average producer prices in 1952-56 were inserted. For the calculations based on grain values, the values developed by Mielck and Woermann were used. The grain values indicated the quantity of grain equivalent required for the production of one unit of a certain animal product.

The results of Huth's investigations raise the question whether the total live weight of the animal stock and its value has increased in the past years because feed input increased more rapidly than the productive capacity of animals. This could be particularly true in the case of cattle. Although there is no statistical information on average weights of the stock, the officially ascertained slaughtering weights allow some conclusions. At the present time, slaughtering weights of oxen, bulls, cows, and heifers actually are higher than in previous periods (table 80). The increases were 8 percent for oxen, 9 percent for bulls, 18 percent for cows, and 18 percent for heifers. Those of hogs (commercial slaughterings) as well as of horses and sheep were 12 percent, 24 percent, and 15 percent, respectively. Since the increases in average weight are not covered in annual inventory changes of livestock, the feed conversion rate seems to be somewhat more favorable than prior to World War II. At any rate, the differences are not significant.

3. Projecting Feed Requirements and Import Demand Until 1975

For 1965 a total domestic production of feeds equivalent in food value to 5.74 million tons of grain is projected; for 1975 this figure is increased to 6.28 million tons (table 96). The 1965 production will be equivalent to 0.54 million ton of digestible protein and 4.13 million tons of starch equivalent, while that of 1975 will be equivalent to approximately 0.58 million ton of digestible protein and 4.52 million tons of starch equivalent.

Since the feed conversion rate is expected to remain unchanged, Austrian agriculture will need an amount of feedstuffs equal to its output of animal products (in grain equivalent). It will be recalled from the previous section that the ratio of the total feed input (in grain equivalent) and the total livestock production (also in grain equivalent) has remained fairly constant at about unity over a long period of time. On the basis of the estimated output of milk plus meat and eggs, total feed consumption can be projected at 6.87 million tons of grain equivalent in 1965 and at 7.59 (Projection B) to 8.06 (Projection A) million tons of grain equivalent in 1975 (table 97).

33/ F. W. Huth, "Ergebnisse täglicher Milch-und Futterkontrolle bei Leistungs-kühen des schwarzbunten Niederungsrindes in Mariensee", Zeitschrift für and Tierzuchtüng und Züchtungsbiologie, Vol. 66, No. 3, 1956, p. 284 f.

Table 96. – Domestic feed production, by type of feedstuff, projections for 1965 and 1975, Austria 1/

Type of feedstuff	Content per 100 kilograms		1965			1975		
	Digestible protein (kilograms)	Starch equivalent (kilograms)	Quantity (1,000 tons)	Digestible protein (1,000 tons)	Starch equivalent (1,000 tons)	Quantity (1,000 tons)	Digestible protein (1,000 tons)	Starch equivalent (1,000 tons)
Bread grain	9.5	70	117	11.1	81.9	200	19.0	140.0
Coarse grain	7.0	70	857	60.0	600.0	1,080	75.6	756.0
Bran	10.0	47	150	15.0	70.5	150	15.0	70.5
Feeding meal	10.0	73	82	8.2	59.6	82	8.2	59.6
Potatoes	1.0	20	2,597	26.0	519.4	2,934	29.3	586.8
Pulses	19.0	66	1	0.2	0.7	1	0.2	0.7
Brewer's grains	14.0	50	34	4.8	17.0	45	6.3	22.5
Malt germs	14.0	40	6	0.8	2.4	8	1.1	3.2
Oilcake	30.0	70	9	2.7	6.3	9	2.7	6.3
Beet tops and leaves	1.7	9	1,389	23.6	125.0	1,363	23.2	122.7
Sugarbeet slices	0.5	7	605	3.0	42.4	660	3.3	46.2
Fodder beets	0.4	7	1,935	7.7	135.5	1,701	6.8	119.1
Green forage	0.8	8	1,428	11.4	114.2	1,615	12.9	129.2
Clover hay	7.0	30	1,348	94.4	404.4	1,270	88.9	381.0
Hay from meadows	4.0	32	5,040	201.6	1,612.8	5,347	213.9	1,711.0
Cow milk	3.2	17	595	19.0	101.2	680	21.8	115.6
Goat milk	3.1	16	35	1.1	5.6	25	0.8	4.0
Skim milk	4.0	10	558	22.3	55.8	651	26.0	65.1
Skim milk powder	33.5	50	4	1.3	2.0	6	2.0	3.0
Pasture	–	–	–	23.6	177.2	–	23.6	177.2
Total				537.8	4,134.2		580.6	4,520.0
Grain equivalent (1.39 times starch equivalent)					5,741.9			6,277.8

1/ Calculations of the Institute.

Projected feed consumption substantially exceeds projected domestic production. Thus, a large increase in future imports of feed grains is projected for Austria. According to the projections of this study the import demand for feedstuffs will increase over the next one to 2 decades, from the recent 508,000 tons of grain equivalent (based on the 1955-59 average) to 1.13 million tons in 1965 and to 1.78 million tons (Projection A) or 1.31 million tons (Projection B) in 1975 (table 98). This means that feed grain imports will double to triple if crop and animal production develop in the future in line with projections. Even in 1960, imports of important feedstuffs rose to 0.65 million ton of grain equivalent as compared to only .51 million ton on the 1955-59 average. This rise occurred in spite of bumper harvests of grains, row crops, and hay.

If the ratios of import prices for coarse grains, milling byproducts, fish meal, meat meal, and oilcake all remain the same as in 1960, the volume of imports can be expected to be slightly above 1 million tons of coarse grains in 1965 and 1.6 million tons (Projection A) or 1.2 million tons (Projection B) in 1975. About three-quarters to four-fifths of the import demand will be met by corn. The demand for protein concentrate feeds such as fish and meat meal is estimated at 40,000 tons in 1965 and at 50,000 (Projection B) to 60,000 (Projection A) tons in 1975. The demand for oilcake will amount to 50,000 tons in 1965 and to 62,500 or 75,000 tons in 1975. Imports of bran and feeding meal will continue to fall considerably short of the 1937 level due to the low prices in Austria. Demand will probably not exceed 20,000 tons a year.

Table 97. – Total feed consumption and feed requirements for producing the various livestock products, 1959, and projections for 1965 and 1975, Austria 1/

Year	Total feedstuff consumed, grain equivalent (1,000 tons)	Grain equivalent feedstuffs used in the production of livestock products			
		Meat (1,000 tons)	Eggs (1,000 tons)	Milk (1,000 tons)	Other products (1,000 tons)
1959	5,707.7	3,399.1	283.8	2,001.3	23.5
1965	6,870.2	4,312.3	339.5	2,201.2	17.2
1975 A	8,061.9	5,094.7	405.0	2,548.7	13.5
1975 B	7,585.9	4,828.7	405.0	2,338.7	13.5

1/ Based on calculations of the Institute.

Table 98. – Imports of feedstuffs and related data, 1955-59, and projections for 1965 and 1975, Austria 1/

Year	Domestic production, grain equivalent (1,000 tons)	Total demand, grain equivalent (1,000 tons)	Import demand	
			Total grain equivalent (1,000 tons)	Percent of total demand
1955-59 av.	4,970.4	5,478.4	508.0	9.3
1965	5,741.9	6,870.2	1,128.3	16.4
1975 A	6,277.8	8,061.9	1,784.1	22.1
1975 B	6,277.8	7,585.9	1,308.1	17.2

1/ Calculations of the Institute.

VII. DEMAND FOR FOOD AND TOBACCO: BACKGROUND INFORMATION

This chapter describes historical trends in the consumption of food and tobacco products. It also summarizes major types of information about food and tobacco consumption contained in the official Food Balance Sheets and in the Farm Consumption Survey of 1959. Thus, the present discussion may be considered as important background information for the treatment of demand methodology and projections to be presented in the next chapter.

The Austrian Food Balances are prepared by the Ministry of Agriculture and Forestry and the Economic Department (formerly Food Department) of the Ministry of the Interior in accordance with international standards (as set by the FAO and OECD). They relate to crop years (1st of July to 30th of June). In addition, the Austrian Institute of Economic Research calculates the consumption of a few selected food items for calendar years. In the present study the Food Balance Data have been used because of their higher degree of representativeness.

1. Recent Development in Consumption of Food and Tobacco

1.1 Overall Food Consumption

The consumption of food, as given in the data of the official Food Balance Sheets, results from the balance of home production and foreign trade, making allowance for changes in stocks and the quantities used for seeds, feeding, and industrial purposes. The Food Balances have been stated for the average of the prewar years 1934-1938 and for each of the years beginning with the crop year of 1947-48 (tables 99 and 100). The consumption data are not equally reliable for all products. The consumption of bread grains, meat, fats, milk and dairy products, sugar, and citrus fruit can be ascertained fairly accurately. The consumption of other products (in particular of eggs, vegetables, fruit, and potatoes) can be estimated only approximately. As the errors of estimate will hardly remain constant over time, the estimated changes in consumption also will not be completely reliable.

The retail prices of food commodities have been taken from the reports of municipal market authorities in the four metropolitan areas of Vienna, Graz, Linz, and Salzburg (except where the prices are government controlled). The weekly quotations from these cities were used to obtain average prices relating to crop years and these were combined with an Austrian total, using as weights the population of the respective provinces to which the four cities belong, so that the weight is 0.39 for Vienna, 0.27 for Graz, 0.26 for Linz, and 0.08 for Salzburg (table 101).

To make price quotations agree with the food nomenclature applied to food balance data, average prices had to be computed for various commodity groups (bread grain products, fats, meat, fish, pulses, fruit and vegetables). The weights used correspond to the share of the individual goods in total consumption (which was partly estimated) in the years in question. The average price of the various kinds of meat (beef, veal, and pork) was computed on the basis of tables which state what marketable proportions of the different types and cuts of meat are produced from the respective animals. The prices

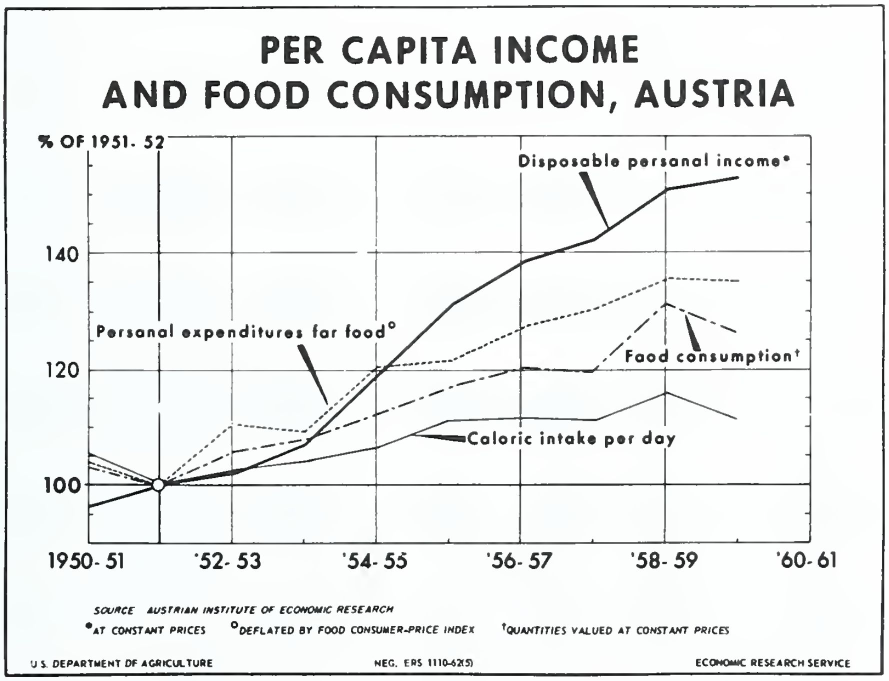
Table 99. – Total consumption of food, by commodities, 1934-60, Austria 1/

Food Commodity	1934-38	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
	1,000 metric tons													
Bread grain, product weight	1,068	980	1,055	1,022	1,067	931	985	988	992	1,022	980	988	1,066	1,018
Bread grain, flour equivalent	810	892	896	823	820	717	746	744	747	770	735	735	750	735
Barley, oats, maize, product weight	70	120	70	70	70	70	70	70	70	70	70	70	70	50
Barley, oats, maize, cereal equivalent	49	79	49	49	49	49	49	49	49	49	49	49	49	36
Butter 2/	20	13	20	21	20	20.5	23	23.5	24.5	29	25	23	24	24.5
Vegetable oils	34.5	25	40	36.5	30.5	32.5	28	27	29.5	37	46.5	50.5	53	57.5
Fish oils	–	–	2.5	1	0.5	2	5	11	11	10.5	7.5	8	9.5	9
Lard and tallow	62	27	39	47.5	66	56.5	55.5	52	52.5	49.5	49.5	46.5	41.5	34.5
Fats and oils, total	116.5	65	101.5	106	117	111.5	111.5	113.5	117.5	126	128.5	128	128	125.5
Beef	88	55	57.5	65	77	77.5	79.5	85	86.5	88.5	90	93	97	98
Veal	19	13	14.5	13.5	20	18	26.5	26.5	28	25.5	24.5	24	23	20
Pork	190	56	70.5	114	145	137.5	161	165.5	176	188	193.5	196	218	221
Poultry	8	2	3	3.5	3.5	3	5	5	5.5	7	9	9.5	14.5	19.5
Other meat	17	12	14	10.5	11.5	14.5	15	15	16.5	14.5	15	15	14.5	15
Offal	8	2	3	6	8	7.5	8	8	7.5	8.5	8	8.5	7.5	7.5
Meat, total	330	140	162.5	212.5	265	258	295	305	320	332	340	346	374.5	381
Eggs	45	16.5	25	23	33.5	34	40.5	51	52	57	66	70	70.5	81
Cow milk	1,179	556	700	836	1,060	1,029	1,049	1,127	1,148	1,152	1,124	1,133	1,135	1,143
Skim milk	–	105	202	162	84	110	111	44	49	52	86	90	86	86
Cream		–	–	1.5	5	4.5	5	5	6.5	7.5	8.5	10	11	12.5
Condensed milk	3/	3	–	-	0.5	0.5	1.5	–	–	1	2	1.5	1.5	2.5
Dried milk		5	4	3	2	1.5	1.5	2.5	1	3.5	5	5	2	2.5
Cheese	15	5	8	13	11	12.5	15	14	15.5	19	20.5	20.5	19.5	19.5
Cottage cheese	10	2.5	4	5.5	5.5	4.5	5.5	7	7	7.5	8.5	9	9	11
Sugar	163	83	161.5	165.5	185	185	185	178.5	192.5	224.5	230.5	239	241.5	239.5
Potatoes	650	800	800	750	730	715	700	685	670	670	670	660	650	620
Vegetables	390	278	427	430	427	425	426	428	427	447	452	450	458	465
Fresh fruit	251	150	271	293	352	300	310	311	276	348	453	240	696	398
Citrus fruit	30	–	31	19	15	19	29	41	49	51.5	57	87	71	88.5
Dried fruit	8	7	8	6	4	5	5	7	9	8	8	8.5	8	8.5
Fruit juices	–	–	–	–	–	–	–	–	–	10.5	12.5	14.5	16	18

1/ According to the Food Balances prepared by the Ministry of Agriculture and Forestry and the Economic Section of the Ministry of the Interior. 2/ Pure fat content. 3/ Contained in the figure for cow's milk.

of the individual kinds of fruits and vegetables were combined with average prices for southern fruit and other fruit and vegetables by applying the weights used for the consumer price index. The weights vary according to the season, thus taking account of the unequally distributed market supply.

For the purposes of demand analysis, the food prices as such are less relevant than their relation to other prices. The series of "real prices" have been derived from the current prices through dividing them by the index of consumer prices.



SOURCE AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

*AT CONSTANT PRICES °DEFLATED BY FOOD CONSUMER-PRICE INDEX †QUANTITIES VALUED AT CONSTANT PRICES

Figure 30

Apart from short-run fluctuations, food consumption has increased vigorously since 1950, starting from a relatively low level (figure 30). In the first postwar years, official rationing controlled the amount and composition of food consumption. Only from 1950 on have consumers been largely free to choose what they wanted. By the end of 1950, only subsidized cooking oil and sugar were controlled. Sugar was available on the free market. In 1951, however, fats and meat became scarce again due to the Korean crisis and a misguided price policy. All imported fats had to be rationed again, the production of sausages was curtailed and meatless days introduced. These measures decreased consumption very little and became superfluous again in 1952. In mid-1953, rationing was finally abolished. The slight recession in 1959-60 is largely explained by lower consumption of fruit due to the poor crop in 1959. In 1960-61, consumption probably increased again. Weighted by average prices of the 5-year period from 1952-53 to 1956-57, per capita food consumption in 1959-60 was 22 percent higher than in 1950-51 and 15 percent higher than before the war. As far as per capita food consumption is concerned, the annual growth rate has shown a marked tendency to decline in recent years.

Table 100. – Per capita food consumption, by commodities, 1934-60, Austria 1/

Food commodity	Unit	Average: 1934:1938	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Per year:															
Bread grain products 2/	Kilograms	120.0	126.1	126.4	115.9	117.1	103.4	107.3	107.1	107.3	109.7	104.6	104.9	107.0	104.0
Cereal preparations	"	7.3	11.2	6.9	6.9	7.0	7.1	7.1	7.0	7.1	7.0	7.0	7.0	7.0	5.1
Butter 3/	"	3.0	1.8	2.8	3.0	2.8	3.0	3.3	3.4	3.5	4.1	3.6	3.3	3.4	3.5
Vegetable oils	"	5.1	3.5	5.6	5.1	4.3	4.7	4.0	4.0	4.2	5.3	6.6	7.2	7.6	8.1
Fish oils	"	–	–	0.4	0.1	0.1	0.3	0.7	1.6	1.6	1.5	1.1	1.1	1.1	1.3
Lard and tallow	"	9.2	3.8	5.5	6.7	9.4	8.1	8.0	7.5	7.5	7.2	7.0	6.6	5.9	4.9
Fats and oils, total	"	17.3	9.1	14.3	14.9	16.7	16.1	16.0	16.5	16.9	18.0	18.3	18.3	18.3	17.8
Beef	"	13.0	7.8	8.1	9.2	11.0	11.2	11.4	12.2	12.4	12.6	12.8	13.3	13.8	13.9
Veal	"	2.8	1.8	2.0	1.9	2.9	2.6	3.8	3.8	4.0	3.6	3.5	3.4	3.3	2.8
Pork	"	28.1	7.9	9.9	16.1	20.7	19.8	23.2	23.8	25.3	26.9	27.5	28.0	31.1	31.3
Poultry	"	1.2	0.3	0.4	0.5	0.5	0.4	0.7	0.7	0.8	1.0	1.3	1.4	2.1	2.8
Other meat	"	2.4	1.6	1.9	1.4	1.5	2.1	2.1	2.1	2.3	2.0	2.1	2.0	1.9	2.0
Offal	"	1.2	0.3	0.4	0.8	1.1	1.1	1.2	1.2	1.1	1.2	1.1	1.2	1.1	1.1
Meat, total	"	48.7	19.7	22.7	29.9	37.7	37.2	42.4	43.8	46.0	47.3	48.3	49.3	53.3	53.9
Eggs	"	6.7	2.3	3.5	3.2	4.8	4.9	5.8	7.3	7.5	8.1	9.4	10.0	10.1	11.5
Cow milk		174.7	78.6	98.7	117.7	151.4	148.4	150.9	162.2	164.9	164.6	159.9	161.6	161.9	161.8
Skim milk	"	–	14.6	28.5	22.8	12.0	15.9	16.0	6.3	7.1	7.4	12.2	12.8	12.3	12.2
Cream	"	–	–	–	0.2	0.7	0.6	0.7	0.7	0.9	1.1	1.2	1.4	1.6	1.8
Condensed milk	"	4/	0.4	–	–	0.1	0.1	0.2	–	–	0.1	0.3	0.2	0.2	0.2
Dried milk	"	–	0.7	0.6	0.4	0.3	0.2	0.2	0.3	0.2	0.5	0.7	0.7	0.3	0.4
Cheese	"	2.2	0.7	1.9	1.8	1.6	1.8	2.2	2.0	2.2	2.7	2.9	2.9	2.8	2.8
Cottage cheese	"	1.5	0.4	0.6	0.8	0.6	0.8	0.8	1.0	1.0	1.1	1.2	1.3	1.3	1.6
Sugar	"	24.1	11.7	22.8	23.3	23.6	26.7	24.5	25.7	27.7	32.1	32.8	34.1	34.5	33.9
Potatoes	"	96.3	113.1	112.8	105.6	104.3	103.1	100.7	98.6	96.3	95.7	95.3	94.2	92.7	87.7
Vegetables	"	57.8	39.3	60.2	60.6	61.0	61.3	61.3	61.6	61.4	63.9	64.3	64.2	65.3	65.8

Table 100. – Per capita food consumption, by commodities, 1934-60, Austria 1/–Continued

Food commodity	Unit	Average: 1934-38	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Per year (Cont.)															
Fresh fruit	Kilograms	37.2	21.2	38.2	41.3	50.3	43.3	44.6	44.7	38.7	49.7	64.4	34.2	99.3	56.3
Citrus fruit	"	4.4	1.0	4.4	2.7	2.1	2.7	4.2	5.9	7.1	7.4	8.1	12.4	10.1	12.5
Dried fruit	"	1.2	1.0	1.1	0.8	0.6	0.7	0.7	1.0	1.3	1.1	1.1	1.2	1.1	1.2
Fruit juices	"	-	-	-	-	-	-	-	-	-	1.5	1.8	2.1	2.3	2.5
Total food consumption 5/ 6/	1950-51 = 100	106.3	72.5	85.4	90.1	100.0	96.8	102.5	104.4	107.0	113.2	116.5	115.8	126.9	122.1
Per day:															
Calorie intake 6/	Calories	2,936	2,298	2,601	2,626	2,786	2,647	2,712	2,754	2,810	2,937	2,950	2,938	3,067	2,949
Protein supply 6/	Grams	88	73	75	76	81	78	81	82	84	86	86	87	89	88
of which animal protein	"	40	21	26	30	35	36	38	39	41	42	43	44	45	46
Fat 6/	"	102	51	69	79	92	88	92	95	98	103	105	106	109	107

1/ According to the Food Balances prepared by the Ministry of Agriculture and Forestry and the Economic Section of the Ministry of the Interior.
2/ Flour equivalent.
3/ Pure fat content.
4/ Included in cow milk.
5/ Consumption at constant average prices of the period from 1952-53 to 1956-57.
6/ For the purpose of this calculation, consumption of various food groups (especially grain products, fats, meat, pulses) has been estimated by individual products (partly rough estimates).

Table 101. – Retail prices of food by commodities, 1947-59, Austria 1/

Commodity	Cities included	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
		Current prices in AS per kilogram (unless stated otherwise)											
Flour	2/	1.50	1.62	1.86	2.69	4.25	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Brown bread	2/	1.07	1.19	1.90	2.28	3.49	3.50	3.50	3.50	3.50	3.68	3.74	3.74
Rolls	2/	1.96	2.17	3.70	5.43	8.70	8.70	8.70	8.70	8.70	9.57	9.78	9.78
Macaroni, noodles, etc.	Vienna, Graz	3.03	3.41	4.24	6.20	9.68	9.65	9.99	9.97	11.41	11.64	11.78	11.85
Semolina	2/	1.58	1.73	2.50	3.10	4.74	4.80	4.80	4.80	4.80	4.80	4.80	4.80
All flour products		1.81	2.00	3.02	4.16	6.53	6.58	6.24	6.24	6.38	6.73	7.00	7.08
Cereal preparations	Vienna, Graz	2.71	3.00	4.65	8.86	10.90	11.18	11.18	11.31	11.30	11.29	11.17	11.30
Dairy butter	2/	12.61	19.35	22.00	22.00	34.69	35.20	35.20	35.20	35.20	35.20	35.20	35.20
Farm butter	2/	10.10	16.35	18.70	18.70	26.68	27.00	27.00	27.00	27.00	27.00	27.00	27.00
All butter		11.96	18.41	21.02	20.81	32.31	32.80	32.86	32.78	33.51	33.15	33.60	33.48
Cooking oils	Vienna, Graz	8.41	8.00	8.00	10.96	12.11	11.19	14.56	14.11	12.55	14.78	14.47	13.37
Olive oil	Vienna	-	-	20.98	29.21	30.42	21.63	22.76	23.54	25.93	34.61	30.13	29.00
All oil		8.41	8.00	8.68	12.26	13.13	11.74	14.92	14.50	12.91	15.33	14.91	13.78
High grade margarine	Vienna	-	-	-	-	-	-	-	-	-	19.20	19.20	19.20
Other milk margarine	Vienna	-	-	-	-	-	15.56	14.10	14.10	13.82	13.60	13.60	13.60
All milk margarine		-	-	-	-	-	15.56	14.10	14.10	13.82	13.95	15.07	14.97
Other margarine	Vienna	6.88	6.88	7.16	8.50	10.33	10.40	13.30	13.25	11.96	11.15	11.30	11.99
All margarine		6.88	6.88	7.16	8.50	10.33	12.05	13.92	13.92	13.51	13.64	14.71	14.64
Compound fats	Vienna	8.40	8.00	8.00	8.00	10.88	11.00	14.40	14.41	14.25	14.10	14.20	14.80
Lard margarine	Vienna												
Coconut fat	Vienna	-	-	-	-	-	14.89	16.16	16.14	13.66	14.10	13.40	14.95
All vegetable fats		8.40	8.00	8.00	8.00	10.88	11.97	14.84	15.28	13.96	14.10	13.67	14.81
Lard, imported	Vienna, Graz, Linz	8.43	12.64	14.00	10.65	15.31	14.40	14.35	14.35	14.32	14.76	15.55	15.63
Lard, domestic					16.09	21.44	21.09	19.21	21.11	20.48	20.11	19.38	18.70
All lard		8.43	12.64	14.00	12.49	17.87	17.42	16.48	17.45	17.19	17.82	18.03	17.64
Backfat	Vienna, Graz, Linz	-	8.00	-	16.29	20.63	19.16	17.60	17.86	17.02	16.16	14.01	13.85
Bellyfat	" " "	6.00	9.00	9.40	16.13	22.12	19.72	17.59	17.42	16.29	15.73	13.46	13.17
All lard, backfat, bellyfat		8.68	12.34	13.44	14.48	20.54	19.62	17.83	19.02	18.28	18.53	17.69	16.96
Tallow	Vienna, Graz	-	-	-	-	13.60	8.34	5.96	6.47	6.87	6.93	6.67	6.48
Beef 4/	Vienna, Graz	6.96	9.24	9.88	12.97	20.58	19.48	18.43	21.37	22.66	22.97	24.03	24.30
Veal 4/	" "	9.11	11.92	11.11	15.48	18.84	20.92	20.48	22.02	22.53	24.17	27.16	28.61
Pork 4/	" "	8.62	11.98	17.92	16.26	21.45	21.23	20.53	21.86	22.07	22.58	22.88	23.36
Poultry 5/	"	26.47	31.07	23.76	21.84	30.42	29.48	29.71	29.66	30.83	30.25	30.32	30.17

Table 101. – Retail prices of food by commodities, 1947-59, Austria 1/ – Continued

Commodity	Cities included	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
		Current prices in AS per kilogram (unless stated otherwise)											
Other meat 6/	Vienna	5.78	7.47	14.03	11.75	15.95	16.03	14.32	16.06	18.15	18.58	19.69	20.40
All meat		8.01	10.88	14.82	15.00	20.63	20.46	19.62	21.40	22.18	22.74	23.49	24.03
Eggs, domestic, per egg	Vienna, Graz, Linz, Salzburg	0.52	0.68	1.18	1.01	1.22	1.15	1.13	1.12	1.24	1.16	1.10	1.10
Eggs, imported, per egg	Vienna	-	0.66	0.76	0.87	1.09	1.14	1.14	1.16	1.28	1.06	1.13	1.06
All eggs		0.52	0.67	1.14	1.00	1.20	1.15	1.13	1.12	1.24	1.15	1.10	1.10
Milk, per liter	2/	0.81	1.25	1.46	1.46	2.04	2.08	2.21	2.21	2.21	2.29	2.30	2.30
Skim milk, per liter	2/	0.44	0.58	0.66	0.64	0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Cream (for whipping), per liter	2/	-	-	16.00	16.00	23.31	23.60	23.60	23.60	23.60	23.60	23.60	23.60
Sour cream, per liter	2/	-	-	6.00	6.00	7.92	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Condensed milk	2/	-	1.52	-	-	-	-	7.61	6.87	7.36	6.86	6.86	6.86
Dried milk	2/	-	-	-	19.81	19.81	19.81	25.94	25.94	25.94	25.94	25.94	25.94
Cheese 7/	2/	10.30	15.89	19.39	19.79	23.79	24.08	24.08	24.01	23.89	23.88	23.89	23.89
Sugar	2/	2.30	3.32	4.16	5.21	6.50	6.54	6.46	6.31	6.05	5.96	5.96	6.10
Potatoes	Vienna, Graz, Linz, Salzburg	0.46	0.48	0.75	1.06	1.42	1.43	1.21	1.47	1.59	1.56	1.57	1.80
Vegetables 8/	Vienna, Graz, Linz, Salzburg	2.46	2.53	2.55	2.97	3.81	4.03	3.86	4.70	4.88	4.74	5.14	4.80
Fresh fruit 8/	Vienna, Graz, Salzburg	4.11	3.58	2.80	2.72	4.24	3.83	4.56	4.48	4.60	5.07	6.73	4.26
Southern fruit	Vienna, Graz, Salzburg	15.17	12.67	11.40	13.70	17.46	15.32	12.29	10.56	10.32	10.32	10.56	8.81
Rice	Vienna, Graz, Linz, Salzburg	4.63	3.23	5.83	7.31	7.78	8.22	8.95	8.29	6.88	6.44	6.58	6.58
Honey	Vienna, Graz, Linz, Salzburg	18.87	37.07	26.65	22.43	25.85	28.80	28.18	27.34	27.03	28.53	27.92	29.01
Beans	Vienna, Graz, Linz, Salzburg	1.44	1.52	1.55	3.84	7.19	8.56	8.08	7.47	6.94	6.98	7.44	7.56
Peas	Vienna, Graz, Linz, Salzburg	1.22	1.20	1.56	4.80	7.75	9.14	8.87	8.87	9.28	9.43	9.60	9.88
Lentils	Vienna, Graz, Linz, Salzburg	1.83	2.48	5.78	7.07	9.41	9.71	9.17	8.71	8.32	9.28	11.27	15.16
All pulses		1.35	1.27	1.86	4.86	7.96	9.04	8.73	8.28	8.47	8.47	9.21	10.01

Table 101. – Retail prices of food by commodities, 1947-59, Austria 1/ – Continued

Commodity	Cities included	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
		Current prices in AS per kilogram (unless stated otherwise)											
Salt water fish, fresh	Vienna, Graz, Salzburg	-	7.40	8.37	8.64	11.17	11.74	12.96	13.00	12.89	12.97	13.33	14.53
Fresh water fish, fresh	Vienna, Graz, Salzburg	-	15.35	14.14	13.54	17.76	17.67	18.44	19.80	19.79	20.53	20.87	20.77
Fish, smoked, salted, dried	Vienna, Graz, Salzburg	-	18.02	12.36	13.92	19.55	18.84	17.79	16.93	17.51	19.43	18.76	20.03
Fish, pickled	Vienna, Graz, Salzburg	11.80	10.98	12.94	15.36	21.13	21.33	20.71	20.17	20.72	24.23	25.16	26.31
All fish		-	11.03	9.41	9.84	12.47	13.12	14.45	14.59	14.67	14.93	15.19	16.57
		Real prices in AS per kilogram (unless stated otherwise) 3/											
Flour	2/	2.86	2.55	2.59	3.48	4.25	4.41	4.36	4.32	4.17	4.09	3.94	3.93
Brown bread	2/	2.04	1.87	2.65	2.95	3.49	3.59	3.55	3.52	3.39	3.50	3.42	3.42
Rolls	2/	3.73	3.41	5.15	7.02	8.70	8.91	8.81	8.74	8.44	9.10	8.96	8.95
Macaroni, noodles, etc.	Vienna, Graz	5.77	5.36	5.91	8.02	9.68	9.89	10.12	10.02	11.07	11.06	10.79	10.84
Semolina	2/	3.01	2.72	3.48	4.01	4.74	4.92	4.86	4.82	4.66	4.55	4.40	4.39
All flour products		3.45	3.14	4.21	5.38	6.53	6.74	6.32	6.27	6.19	6.40	6.41	6.48
Cereal preparations	Vienna, Graz	5.16	4.72	6.48	11.46	10.90	11.45	11.33	11.37	10.96	10.73	10.23	10.34
Dairy butter	2/	24.02	30.42	30.64	28.46	34.69	36.07	35.66	35.38	34.14	33.46	32.23	32.20
Farm butter	2/	19.24	25.71	26.04	24.19	26.68	27.66	27.36	27.14	26.19	25.67	24.73	24.70
All butter		22.78	28.95	29.28	26.92	32.31	33.29	33.29	32.94	32.15	31.51	30.77	30.63
Cooking oils	Vienna, Graz	16.02	12.58	11.14	14.18	12.11	11.47	14.75	14.18	12.17	14.05	13.25	12.23
Olive oil	Vienna	-	-	29.22	37.79	30.42	22.16	23.06	23.66	25.15	32.90	27.59	26.53
All oil		16.02	12.58	12.09	15.86	13.13	12.03	15.12	14.57	12.52	14.57	13.65	12.61
High-grade margarine	Vienna	-	-	-	-	-	-	-	-	-	18.25	17.58	17.57
Other milk margarine	"	-	-	-	-	-	15.94	14.29	14.17	13.40	12.93	12.45	12.44
All milk margarine		-	-	-	-	-	15.94	14.29	14.17	13.40	13.26	13.80	13.70
Other margarine	Vienna	13.10	10.82	9.97	11.00	10.33	10.66	13.48	13.32	11.60	10.60	10.35	10.97
All margarine	"	13.10	10.82	9.97	11.00	10.33	12.35	14.10	13.99	13.10	13.97	13.47	13.39
Compound fats	Vienna	16.00	12.58	11.14	10.35	10.88	11.27	14.59	14.48	13.82	13.40	13.00	12.81
Lard margarine	"												13.54

Table 101. – Retail prices of food by commodities, 1947-59, Austria 1/ – Continued

Commodity	Cities included	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
		Real prices in AS per kilogram (unless stated otherwise) 3/											
Coconut fat	Vienna	-	-	-	-	-	15.26	16.37	16.22	13.25	13.40	12.27	13.68
All vegetable fats		16.00	12.58	11.14	10.35	10.88	12.26	15.04	15.36	13.54	13.40	12.52	13.55
Lard, imported	Vienna, Graz, Linz	16.06	19.87	19.50	13.78	15.31	14.75	14.54	14.42	13.89	14.03	14.24	14.30
Lard, domestic					20.82	21.44	21.61	19.46	21.22	19.86	19.12	17.75	17.11
All lard		16.06	19.87	19.50	16.16	17.87	17.85	16.70	17.54	16.67	16.75	16.51	16.14
Backfat	Vienna, Graz	-	12.58	-	21.07	20.63	19.63	17.83	17.95	16.51	15.36	12.83	12.67
Bellyfat	" "	11.43	14.15	13.09	20.87	22.12	20.20	17.82	17.51	15.80	14.95	12.33	12.05
All lard, backfat and bellyfat		16.53	19.40	18.72	18.73	20.54	20.10	18.06	19.12	17.73	17.61	16.20	15.52
Tallow	Vienna, Graz	-	-	-	-	13.60	8.55	6.04	6.50	6.66	6.59	6.02	5.93
Beef 4/	" "	13.26	14.53	13.76	16.78	20.58	19.96	18.67	21.48	21.98	21.83	22.01	22.23
Veal 4/	" "	17.35	18.74	15.47	20.03	18.84	21.43	20.75	22.13	21.85	22.98	24.87	26.18
Pork 4/	" "	16.42	18.84	24.96	21.03	21.45	21.75	20.80	21.97	21.41	21.46	20.95	21.37
Poultry 5/	" "	50.42	48.85	33.09	28.25	30.42	30.20	30.10	29.81	29.90	28.75	27.77	27.60
Other meat 6/	" "	11.01	11.75	19.54	15.20	15.95	16.42	14.51	16.14	17.60	17.66	18.03	18.66
All meat		15.26	17.11	20.64	19.40	20.63	20.96	19.88	21.51	21.51	21.62	21.51	21.99
Eggs, domestic, per egg	Vienna, Graz, Linz, Salzburg	0.99	1.07	1.64	1.31	1.22	1.18	1.14	1.13	1.20	1.10	1.01	1.01
Eggs, imported, per egg	Vienna	-	1.04	1.06	1.13	1.09	1.17	1.16	1.17	1.24	1.01	1.03	0.97
All eggs		0.99	1.05	1.59	1.29	1.20	1.18	1.14	1.13	1.20	1.09	1.01	1.01
Milk, per liter	2/	1.54	1.97	2.03	1.89	2.04	2.31	2.24	2.22	2.14	2.18	2.11	2.10
Skim milk, per liter	2/	0.84	0.91	0.92	0.83	0.94	0.97	0.96	0.95	0.92	0.90	0.87	0.87
Cream (for whipping), per liter	2/	-	-	22.28	20.70	23.31	24.18	23.91	23.72	22.89	22.43	21.61	21.59
Sour cream, per liter	2/	-	-	8.36	7.76	7.92	8.20	8.11	8.04	7.76	7.60	7.33	7.32
Condensed milk	2/	-	1.39	-	-	-	-	7.71	6.90	7.14	6.52	6.28	6.28
Dried milk	2/	-	-	-	25.63	19.81	20.30	26.28	26.07	25.16	24.66	23.75	23.72
Cheese 7/	2/	19.62	24.98	27.01	25.60	23.79	24.67	24.40	24.13	23.17	22.70	21.88	21.86
Sugar	2/	4.38	5.22	5.79	6.74	6.50	6.70	6.55	6.34	5.87	5.67	5.46	5.58
Potatoes	Vienna, Graz, Linz, Salzburg	0.88	0.75	1.04	1.37	1.42	1.47	1.23	1.48	1.54	1.48	1.44	1.65
Vegetables 8/	Vienna, Graz, Linz, Salzburg	4.69	3.98	3.55	3.84	3.81	4.13	3.91	4.72	4.73	4.51	4.71	4.39

Table 101. – Retail prices of food by commodities, 1947-59, Austria 1/ – Continued

Commodity	Cities included	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
		Real prices in AS per kilogram (unless stated otherwise) 3/											
Fresh fruit 8/	Vienna,Graz, Linz,Salzburg	7.83	5.63	3.90	3.52	4.24	3.92	4.62	4.50	4.46	4.82	6.16	3.90
Southern fruit 8/	Vienna,Graz, Linz,Salzburg	28.90	19.92	15.88	17.72	17.46	15.70	12.45	10.61	10.01	9.81	9.67	8.06
Rice	Vienna,Graz, Linz,Salzburg	8.82	5.08	8.12	9.46	7.78	8.42	9.07	8.33	6.48	6.12	6.03	6.02
Honey	Vienna,Graz, Salzburg	35.94	58.29	37.42	29.02	25.85	29.51	28.55	27.48	26.22	27.12	25.57	26.54
Beans	Vienna,Graz, Linz,Salzburg	2.74	2.39	2.16	4.97	7.19	8.77	8.19	7.51	6.73	6.63	6.81	6.92
Peas	Vienna,Graz, Linz,Salzburg	2.32	1.89	2.17	6.21	7.75	9.36	8.99	8.91	9.00	8.96	8.79	9.04
Lentils	Vienna,Graz, Linz,Salzburg	3.49	3.90	8.05	9.15	9.41	9.95	9.29	8.75	8.07	8.82	10.32	13.87
All pulses		2.57	2.00	2.59	6.28	7.96	9.26	8.84	8.32	8.22	8.05	8.43	9.16
Salt water fish,fresh	Vienna,Graz, Salzburg	-	11.64	11.66	11.18	11.17	12.03	13.13	13.07	12.50	12.33	12.21	13.29
Fresh water fish,fresh	Vienna,Graz, Salzburg	-	24.14	19.69	17.52	17.76	18.10	18.68	19.90	19.19	19.52	19.11	19.00
Fish,smoked,salted, dried	Vienna,Graz, Salzburg	-	28.33	17.21	18.01	19.55	19.30	18.02	17.02	16.98	18.47	17.18	18.33
Fish, pickled	Vienna,Graz, Salzburg	22.48	17.26	18.02	19.87	21.13	21.85	20.98	20.27	20.10	23.03	23.04	24.07
All fish		-	17.34	13.11	12.73	12.47	13.44	14.64	14.66	14.23	14.19	13.91	15.16

1/ According to the reports of the Municipal Market Authorities; in case of control prices (which are uniform in the whole country) according to official announcements. Average weekly quotations, unless otherwise stated, the average prices of commodity groups have been obtained by weighting individual commodity prices with consumption in respective year, which is a rough estimate.

2/ Uniform price in whole country.

3/ Prices divided by the cost-of-living index, linked to the index of consumer prices(from 1959 on); 1951-52=100.

4/ Average price of various cuts of meats weighted by their respective shares in total carcass using generally accepted tables.

5/ Average price for chicken, ducks, and geese, weighted by estimated shares in supply.

6/ Average price for horse meat, mutton and goat meat weighted by estimated shares in supply.

7/ Average price of various kinds of cheese weighted by shares in supply (in part rough estimate).

8/ Average price of various kinds weighted by quantities varying according to the season, as applied to consumer price index.

The annual rate of growth, based on the regression of 3-year moving averages of consumption on time, was 3.1 percent. 34/

In terms of calories, food consumption has not increased greatly; the annual rate of growth calculated from triennial moving averages was 1.6 percent. In 1958-59, it was 10 percent higher than in 1950-51 but only 4 percent above the prewar level; it even declined by 4 percent in 1959-60. The caloric intake increased less than the volume of food consumption (quantities valued at constant price), mainly because the additional demand since the beginning of the Fifties has been concentrated on relatively expensive products (such as meat, eggs, cheese, and citrus and other fruits) where real expenditure per calorie is high. Inversely the consumption of foods which are high in caloric content but relatively cheap (such as bread grains, lard and tallow) decreased, especially in recent years.

Real expenditure of consumers on food has increased more than the volume of food consumption, as better qualities and more highly processed foods have been increasingly purchased. 35/ In particular, the shift in demand has been (1) from cheap to expensive kinds of meat, sausages, cheese, fruit and vegetables; (2) from ordinary to special bread; (3) from open to packaged goods; and (4) increased purchasing of dairy foods. These are demand shifters that could be taken account of only imperfectly.

The composition of food consumption has changed strongly in the past 9 years. The proportion of the total food consumption (at constant prices) has (1) declined for bread grain products, cereal preparations, potatoes, vegetables, slaughtering fats, and fluid milk, but (2) increased for meat (chiefly pork and poultry), eggs, cheese, vegetable oils, sugar, citrus, and other fruit (table 102). The same pattern exists if the present is compared with prewar times; only the proportion of meat is still lower than before the war.

The shifts in consumption have also changed the nutrient content of food. Since 1950-51, the average consumption of animal protein has increased strongly from 35 grams to 46 grams per person per day, while that of vegetable protein declined from 46 grams to 42 grams. The proportion of animal protein in total protein intake increased from 43 percent to about 52 percent, and is now higher than the 50 precent for prewar.

34/ Calculated according to the semi-logarithmic function $\log_e Yt = \log_e Y_o + bt$ (Y = consumption, t = time, 100b = compound annual percentage growth). The percentage growth rate, p, based on compounding once per year, is obtained from the following relation:

$$Y_t = Y_o e = Y_o (1 + \frac{P}{100})t$$

from which $e^b = (1 + P/100)$ and $P = 100\ (e^b - 1)$.

35/ The figures given on the volume of food consumption (quantities at constant prices) relate to the goods which are recorded in the Food Balances. They are mostly agricultural products, or products in the first stage of manufacture (e. g. sugar, flour). According to the national income data, consumers in 1959-60 spent 30 percent more for food in real terms per capita than in 1950-51.

Table 102. – Percentage distribution of food consumption by major food items, 1934-38, 1950-51, and 1959-60, Austria

Major food item	Percent distribution of total food consumption 1/		
	1934-38 average	1950-51	1959-60
Bread grain products	18.4	22.9	16.5
Cereal preparations	2.3	2.3	1.4
Fats and oils	9.7	9.6	9.3
of which butter	3.2	3.4	3.5
oil 2/	0.7	0.6	1.3
margarine	0.5	0.6	1.7
lard, backfat, etc.	5.0	4.7	2.2
Meat	7.5	6.8	7.0
of which beef	7.5	6.8	7.0
veal	1.7	1.9	1.5
pork	16.8	13.1	16.2
poultry	1.0	0.4	2.0
Eggs	3.8	2.9	5.7
Milk	10.6	9.8	8.5
Cheese and cottage cheese	2.5	1.6	2.5
Sugar	4.2	4.3	5.1
Potatoes	3.9	4.4	3.0
Vegetables	7.1	7.9	7.0
Fresh fruit	4.6	6.7	6.1
Citrus fruit	1.4	0.7	3.5

1/ Consumption at constant average prices of the period from 1952-53 to 1956-57.
2/ Cooking oils and olive oil.

From 1950-51 to 1958-59, the fat content of the diet increased 18 percent. Although 1959-60 represented a decline of 2 percent, the fat content was still 5 percent higher before the war.

1.2 Consumption of Tobacco

The consumption of tobacco can be ascertained with a reasonable degree of precision from 1955 on, as production and imports are controlled by the Austrian Tobacco Monopoly. It keeps monthly records on quantity and value sold of cigarettes, cigars, pipe tobacco, chewing tobacco, and snuff. Until 1955 a black market existed under the military occupation which conducted considerable transactions in foreign cigarettes not statistically recorded. Experts have tried to estimate the amount of these transactions, but these figures are inevitably crude guesses. Nevertheless, in spite of the difficulties, these estimated transactions help to indicate how the demand for tobacco products is changing.

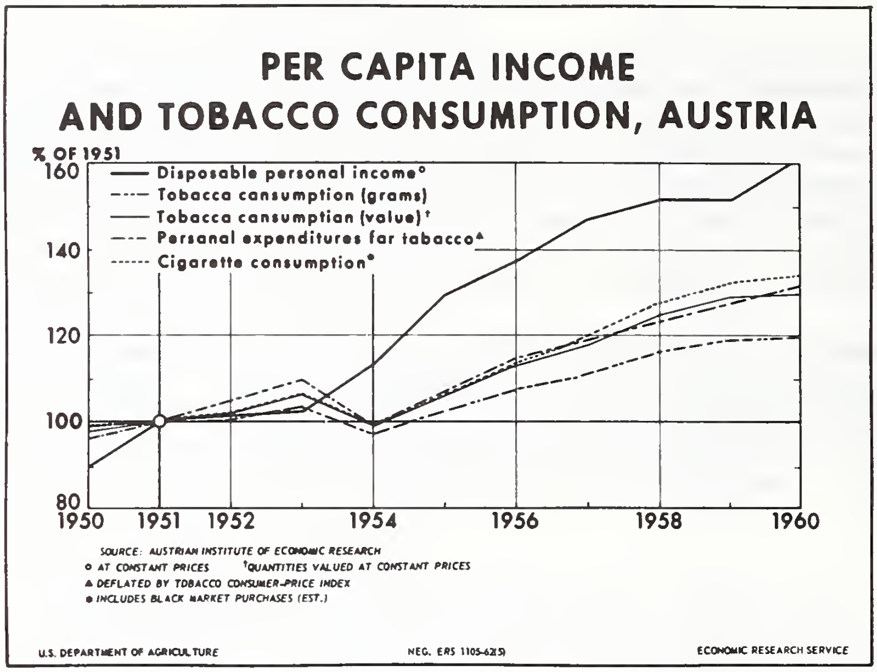
The prices of tobacco products are fixed by a committee of Parliament on the advice of the Austrian Tobacco Monopoly; they are available by brands. The average price of cigarettes and other tobacco products has been obtained by taking the consumption figures of 1954 as weights. A second variant of average prices takes into account the estimated black market prices. The pattern of price changes for tobacco products is illustrated in table 103.

Table 103. —Index of tobacco prices, 1950-60, Austria

Year	1951 = 100	
	Current prices 1/	Real prices 2/
1950	100.0	123.5
1951	100.0	100.0
1952	100.0	87.6
1953	100.0	90.7
1954	114.3	100.7
1955	114.3	99.3
1956	114.3	96.1
1957	114.3	93.9
1958	114.3	93.2
1959	114.3	88.9
1960	115.8	88.2

1/ Weighted with the consumption of 1954.
2/ Prices divided by the cost-of-living index (which was linked to the consumers' price index II by March, 1959), 1951 = 100.

The rationing of tobacco products was abandoned at the beginning of 1949. Consumption since then has steadily increased (figure 31). It declined only in 1954 owing to large price increases. The total quantity sold by the Tobacco Monopoly increased 37 percent from 7,824 tons (tobacco content of all products) in 1950 to 10,750 tons in 1960 (table 104).



SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH
° AT CONSTANT PRICES †QUANTITIES VALUED AT CONSTANT PRICES
▲ DEFLATED BY TOBACCO CONSUMER-PRICE INDEX
● INCLUDES BLACK MARKET PURCHASES (EST.)

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Figure 31.

Including purchases on the black market (which were still appreciable in 1950) consumption has increased about 23 percent. Per capita consumption amounted to 1.13 kilograms in 1950 (about 1.26 kilograms including black market purchases) and to 1.52 kilograms in 1960, increasing about 21 percent for both legitimate and black market purchases (table 105). This corresponds to an average yearly increase of 2.2 percent. Prewar consumption (1.36 kilograms in 1936) was exceeded by 12 percent.

Demand for the various products developed very unevenly. The consumption of cigarettes increased very strongly - from 858 cigarettes per capita (including black market cigarettes, about 988) in 1950 to 1,334 in 1960, or by 35 percent - and was already twice as high as before the war. In 1936 per capita consumption was about 641 cigarettes. The demand for cigars increased during the last decade 63 percent according to numbers (from 8.3 to 13.6 per capita) and 24 percent according to tobacco content (from 41 grams to 51 grams), because increasingly lighter and thinner brands have been preferred. Consumption is still lower than before the war having decreased 13 percent according to number and 26 percent according to tobacco content. The demand for smoking tobacco (pipe and cigarette tobaccos), on the other hand, has declined steadily since 1950. In 1960, only 120 grams were consumed as compared with 210 grams in 1950 (a 43 percent decrease) and 616 grams in 1936 (an 81 percent decline). The consumption of chewing tobacco and snuff has also declined continuously; they are hardly sold anymore.

These shifts caused the share of cigarettes in total consumption of tobacco products (as calculated by tobacco content) to rise from 76 percent in 1950 to 88 percent in 1960, while the share of other tobaccos (pipe, cigarette, chewing tobacco, snuff) decreased from 20 percent to 9 percent. The relative importance of cigar consumption remained almost unchanged, decreasing from 4 to 3 percent. In 1936 the proportion in total tobacco consumption was 45 percent for cigarettes, 5 percent for cigars, and 50 percent for other products.

As demand shifted from tobacco to cigarettes, and partly also from cheap to more expensive brands, consumption in terms of weight (tobacco content) increased less than its value (calculated at average prices of 1951). This value (except the years 1958 and 1959) increased less than real expenditure on tobacco products (current expenditure deflated by a price index for tobacco products). In 1960, consumers bought 21 percent more tobacco products by weight and 32 percent more by volume than in 1950, while real expenditure was 37 percent higher. Since the black market has lost its importance, domestically-produced products are smoked almost exclusively. The share of foreign products in total consumption was on the average of the last 3 years about 3 percent (by weight). It has, however, a tendency to increase slightly. On the average of the last years about 10,000 tons of raw tobacco were processed for meeting domestic demand. As smokers increasingly prefer dark brands of tobacco, the share of oriental tobaccos in imports declines. Greece and Turkey, it is true, are still the most important suppliers, but imports from the United States as well as Brazil and India gain increasingly in importance. The share of home output in the total requirements of raw tobacco (only about 700 tons in 1959) is negligible.

Table 104. – Quantities and value of tobacco sold by the Austrian Tobacco Monopoly; by tobacco commodities, specified years, 1936-60, Austria 1/

Year	Cigarettes (millions)	Cigars (millions)	Pipe tobacco (tons)	Cigarette tobacco (tons)	Snuff (tons)	Other 2/ (tons)	Tobacco products, total 3/ (tons)	Receipts from sales (million AS) 4/
1936	4,332.0	106.0	3,084.3	1,079.1	95.4	293.3	9,166.5	288.4
1950	5,952.7	57.8	1,370.2	73.3	25.6	119.3	7,823.8	1,585.9
1951	6,609.2	66.0	1,298.6	149.5	24.2	123.6	8,505.7	1,757.2
1952	6,913.1	72.3	1,200.2	188.1	22.8	108.5	8,760.0	1,879.4
1953	7,131.5	75.7	1,127.4	187.4	19.6	99.5	8,879.5	1,949.0
1954	6,329.1	76.9	1,057.6	184.9	18.0	90.3	7,987.2	1,957.1
1955	7,143.8	84.8	998.1	193.5	16.9	83.4	8,819.7	2,165.4
1956	7,918.5	89.1	924.0	196.7	15.2	73.6	9,524.3	2,385.0
1957	8,348.7	94.3	867.2	192.6	14.8	63.3	9,838.0	2,482.1
1958	8,898.7	98.4	827.1	180.1	13.8	57.2	10,347.5	2,579.4
1959	9,294.7	98.1	761.1	168.6	12.2	48.5	10,651.5	2,670.8
1960	9,451.3	96.3	713.6	168.3	12.0	45.4	10,750.1	2,813.5

1/ According to data given in "Statistisches Handbuch der Republik Osterreich". Includes own manufactures as well as imported products.

2/ Chewing tobacco and extract of tobacco.

3/ All products in terms of tobacco content.

4/ At current retail prices.

Table 105. - Per capita tobacco consumption, by tobacco commodities, 1950-1960, Austria 1/

Year	Cigarettes (number)	Cigars		Smoking tobacco (grams) 2/	Tobacco products, total 3/				Real expenditure tobacco products 5/	
					By weight		At prices of 1951 4/			
		Number	Grams		Grams	Index (1951=100)	AS	Index (1951=100)	AS	Index (1951=100)
1950	988.1	8.4	40.8	208.1	1,257.9	99.1	255.6	98.0	250.6	96.1
1951	996.5	9.5	43.4	208.8	1,270.0	100.0	260.7	100.0	260.8	100.0
1952	1,016.5	10.4	47.1	199.8	1,282.3	101.0	266.5	102.2	274.1	105.1
1953	1,060.8	10.9	45.1	188.9	1,312.0	103.3	276.5	106.1	286.4	109.8
1954	994.3	11.0	44.1	178.3	1,232.3	97.0	260.3	99.8	258.8	99.3
1955	1,060.2	12.2	55.1	170.9	1,300.5	102.4	276.4	106.0	278.3	106.7
1956	1,133.8	12.7	56.7	160.5	1,363.8	107.4	293.3	112.5	298.8	114.8
1957	1,193.0	13.4	50.7	151.4	1,405.8	110.7	306.9	117.7	310.3	119.0
1958	1,267.4	14.0	52.8	143.4	1,473.7	116.0	323.8	124.2	321.4	123.2
1959	1,318.5	13.9	52.0	131.9	1,511.0	119.0	334.5	128.3	331.5	127.1
1960	1,334.3	13.6	50.8	124.5	1,517.6	120.7	337.2	129.4	343.0	131.5

1/ Sales of the "Tabakregie" including estimated black market purchases (1950-1955).
2/ Pipe and cigarette tobacco.
3/ Cigarettes, cigars, smoking tobacco, snuff, chewing tobacco, and tobacco extract.
4/ Consumption of the various tobacco products at average prices of 1951.
5/ Deflated by the price index for tobacco products (1951 = 100).

Table 106. - Annual per capita food consumption by commodities and individual European countries, 1959-60 1/

Commodity group	Austria	Federal Republic of Germany	Switzerland	Italy	France	Netherlands	Denmark	United Kingdom
	Kilograms							
Bread grains 2/	104.0	80.3	74.5	122.3	100.2	80.8	71.4	76.2
of which wheat 2/	69.9	57.0	66.8	120.4	99.2	74.1	43.6	76.2
Cereal preparations	5.1	3.4	4.7	13.1	4.9	3.1	6.0	6.3
Rice	3.8	1.5	3.5	6.3	1.6	2.3	1.3	1.3
Fats and oils 3/	17.8	25.3	19.7	15.8	16.7	24.9	26.6	22.2
of which butter 3/	3.5	6.4	5.5	1.3	6.5	3.3	8.8	6.5
vegetable oils	8.1	13.0	11.9	10.9	10/ 10.2	10/ 21.6	10.3	15.7
fish oil	1.3		-	-			4.2	
lard and tallow 3/	4.9	5.9	10/2.3	3.6			3.3	
Meat	53.9	54.5	54.4	26.6	74.3	44.2	73.0	67.3
of which beef and veal	16.7	18.2	21.5	13.0	30.1	16.8	23.4	21.2
pork	31.3	28.7	23.1	6.3	21.0	19.8	40.1	8.4
poultry	2.8	3.8	3.5	3.2	8.0	12/ 1.6	4.4	12/ 5.7
Fish	-	-	-	-	-	-	-	-
of which fresh or frozen	2.1	4/ 6.6	1.4	4.7	11.0	11/ 4.6	12.0	8.5
salted, smoked, pickled	0.2		1.3	1.0		1.3	2.4	
canned	1.1			1.0		0.7	0.4	9/ 1.3
Eggs	11.5	13.2	10.2	8.5	11.5	12.3	10.3	15.1
Milk (excl. skim milk)	161.8	5/115.2	187.0	60.5	97.3	164.6	129.5	147.1
Cream	1.8	-	2.5	-	0.9	1.3	8.1	0.5
Condensed and dried milk	0.6	6/7.4	2.4	0.4	2.6	7.7	-	4.7

Table 106. - Annual per capita food consumption by commodities and individual European countries, 1959 - 60 1/ - Continued

Commodity group	Austria	Federal Republic of Germany	Switzerland	Italy	France	Nether-lands	Denmark	United Kingdom
Cheese	4.4	6.8	8.1	7.1	9.0	7.5	7.9	4.4
Sugar	33.9	28.1	41.8	19.8	32.0	43.9	47.5	52.6
Potatoes	87.7	7/140.0	73.0	53.0	100.0	90.0	128.0	88.3
Pulses	1.1	1.2	1.6	5.8	3.2	2.0	2.8	3.8
Vegetables	65.8	8/ 40.1	75.7	137.9	128.3	62.3	63.3	59.0
Fresh fruit	56.3	8/ 47.8	72.5	67.6	33.7	37.0	35.3	38.1
Dried fruit	1.2	1.8	1.2	1.1	1.0	3.2	1.8	2.7
Citrus fruit	12.5	20.0	14.6	11.4	13.4	18.2	8.3	9.2
Fruit juices	2.5	9/ 1.0	11.5	-	2.1	-	0.7	-
Calorie intake per day	2,949	2,890	2,980	2,710	2,940	2,970	3,340	3,290
Protein supplies, grams per day	88	79	85	79	98	80	94	87
of which animal protein	46	46	51	27	52	45	59	52
Fat, grams per day	107	124	125	75	107	125	156	142

1/ Data derived from: OEEC, Food Consumption in the OEEC-Countries. Paris, November 1960. Preliminary data.
2/ Flour equivalent.
3/ Pure fat content.
4/ Weight of cuts.
5/ Including cream.
6/ Dried whole and skim milk.
7/ Including dried potatoes and potato meal.
8/ Excl. imported canned ware.
9/ Imports only.
10/ Incl. other fats and fatty acids.
11/ Product weight.
12/ Incl. rabbits and game.

1.3 Consumption in Austria Compared with that in Other Countries

Even though Austrians consume at present more food (and food of higher quality) than at the beginning of the Fifties, the level of food consumption is still lower than in the countries of western and northern Europe. However, only the Scandinavian countries have a higher caloric intake, mainly because of the climate. But the Austrian population consumes relatively more products which are cheap and high in calories. The consumption of high-grade and relatively expensive foods is on the average still lower than in Switzerland, the Federal Republic of Germany, France, and the United Kingdom.

In 1959-60, Austrian meat consumption per capita was about one-half kilogram less than in Switzerland or the Federal Republic of Germany, about 13 kilograms less than in the United Kingdom, and about 20 kilograms below the level in France (table 106). It has to be considered, too, that countries in maritime regions consume comparatively more fish. If meat and fish are taken together, the gap becomes even greater, especially in comparison to the Federal Republic of Germany, France, and the United Kingdom. Austrian butter consumption in 1959-60 was 36 percent lower than that in Switzerland and 46 percent lower than that in the Federal Republic of Germany, France, and the United Kingdom. The consumption of cheese was about as high as in the United Kingdom, but from 30 percent (Federal Republic of Germany) to 51 percent (France) lower than in the other countries. Although a strong increase has been witnessed in recent years, the consumption of citrus fruit in 1959-60 of 12.5 kilograms was still lower than in Switzerland (14.6 kilograms), the Netherlands (18.2 kilograms), and the Federal Republic of Germany (20 kilograms). Sugar, too, is bought in greater quantities in Switzerland, the Netherlands, Denmark, and the United Kingdom. The Germans and the French consume a little less sugar than Austrians. Of the countries included in the comparison, only Switzerland has a higher consumption of milk than Austria. On the other hand, the Austrian population eats more grain products, as well as more cereal preparations and rice and partly also more potatoes (which often are a substitute for grain products) than most of the western European countries. However, potato consumption in the Federal Republic of Germany, France, and Denmark is higher than in Austria.

As a consequence of the different composition of total food intake, the Austrian population consumes only 46 grams of animal protein per capita per day as compared with levels varying between 45 grams (Netherlands) and 59 grams (Denmark) in the other countries compared. The share of animal protein in total protein supplies amounts to 52 percent, and in the other countries the proportions range from 53 percent (France) to 63 percent (Denmark). If we disregard underdeveloped countries, we may say that the Austrian level of consumption in general exceeds only that of Italy.

The demand for tobacco, too, is lower in Austria than in most other European countries. In 1959, about 1.52 kilograms per capita were consumed as compared to an average of 2.5 kilograms in Switzerland, Belgium, Holland, and Denmark; 2.3 kilograms in the United Kingdom, and almost 2 kilograms in the Federal Republic of Germany. Only in France, Italy, and Spain is the consumption of tobacco somewhat lower than in Austria. In these countries tobacco consumption varies between 1 and 1.5 kilograms. In the United States more than 3 kilograms are consumed. 36/

36/ The data on tobacco consumption in other countries have been taken from the publication "175 Jahre "Österreichische Tabakregie", issued by the Director General of the Austrian Tobacco Monopoly.

2. Farm Consumption Survey of 1959: Methods and Type of Information

The budget surveys are utilized in the demand analysis of the next chapter. They are:

(a) Urban consumption survey of 1954-55. 37/
(b) Farm consumption survey of 1959.

The consumption survey of Austrian city households was carried out by a working group for the preparation of national income accounts. 38/ The methods of this survey and the major types of information it contains are discussed in Chapter VIII.

The consumption survey of Austrian farm households was conducted as an integral part of the present study. To carry out demand projections for agricultural commodities it was necessary to investigate the consumption pattern of the Austrian farm population and to obtain suitable parameters for income elasticities for important consumer goods, particularly food. Prior to the present study there had been no investigations of consumption in farm households, except a few attempts made in Styria.

2.1 Basic Ideas and Preparation for the Survey

The Austrian Institute of Economic Research, lacking a network of regional offices, did not have the apparatus to carry out such an investigation. The regional offices of the official statistical bodies, on the other hand, did not have the necessary contact with farm households. For this reason, the Institute on June 23, 1958, asked the Agricultural Accounting Company at Vienna to conduct the Farm Consumption Survey. The Agricultural Accounting Company (which is partly an accounting firm for agricultural enterprises and partly a subsidized institute for agricultural and statistical research) was chosen for the investigation because it is particularly suited to this task. First, it is organized on a country-wide basis; second, it is well versed in the farm accounting system and was thus able to control the household books run on similar lines; and finally, it has close contacts with farms and farmers' organizations.

After the investigation was properly prepared, a final agreement, dated December 23, 1958, was signed between the Austrian Institute of Economic Research and the above-mentioned Company. The investigation was to be carried out during 1959, and the tabulation of the data by the Company was to be ready by June 30, 1960.

37/ Yearly investigations about consumption in private city households have been made by some regional Chambers of Labor, but these were not utilized in the present study.

38/ Austrian Statistical Office and Austrian Institute of Economic Research (1956). "Der Verbrauch der Stadtischen Bevalkerung Osterreichs" (Consumption of Urban Population in Austria), Forschungstelle zur Aufstellung Volkswirtschaftlicher Bilanzen.

2.2 Responsibility for Carrying Out the Investigation

In nearly all federal provinces, teachers and advisors of home economics employed by the Chambers of Agriculture and the provincial governments helped actively in getting households to cooperate and in advising the participating households. Once the participants were more familiar with their tasks, the assistance of these outside helpers was no longer necessary; contact with the households was then taken care of exclusively by the field statisticians of the regional offices of the Agricultural Accounting Company. Two working conferences in Vienna and occasional visits by members of the Accounting Company introduced the statisticians to their tasks and gave them proper training. The control and tabulation of the incoming material also lay in the hands of the Accounting Company. A common agreement was worked out by the Company and the Institute of Economic Research as to (a) details concerning the investigation, (b) the preparation of the data, and (c) the statistical tables. Difficulties were worked out by the two institutions.

The analysis stage of the investigation was carried out by the Institute of Economic Research, including the calculation of the elasticities from ungrouped data, which was programmed by the Institute of Economic Research on electronic computers at Austrian Nitrogen Company, Inc., at Linz. From the beginning the investigation was actively supported by (1) the Federal Ministry of Agriculture and Forestry and (2) by the Austrian Chambers of Agriculture.

2.3 Sample Size and Selection of Households

It was desired that the Farm Consumption Survey of 1959 should be similar to the Urban Consumption Survey of 1954-55, and give a picture of the structure of total consumption in farm households (consumption of self-produced products and goods purchased on the market).

When the investigation was planned it was decided that it was impossible to draw an exact random sample from the total population of farm households in Austria. Such a random sample would have led to a large number of refusals by farm households because of the difficulty in maintaining separate household and farm enterprise accounts. In addition the need to develop a broad sample over the whole country would have led to such an increase in costs that they could not be met.

For these reasons, a purposive selection of households was undertaken, with the cooperation of an organization having extensive knowledge of farm conditions. In order to make full use of existing contacts it was decided to select the households among those which were already keeping accounts for the Agricultural Accounting Company, and to lay special stress on the control and stratification of the sample. If accounting was already practiced, one could expect greater reliability in the keeping of household books. Households with a parallel system of business accounts were likely to have a "better" and "more rational" household organization than the average of all farm households. The controlled stratified sample consisted of 500 farm households, distributed by federal provinces, production regions, farm size, and type of farming. Households of hired farm employees were excluded.

A system of 12 months of records was chosen in contrast to the Urban Consumption Survey of 1954-55 where household consumption books were kept for only one month. The longer period of records made it easier to cope with irregular accumulation of consumption goods in farm households (harvest, slaughter). It also expanded the scope of the Farm Consumption Survey to the point where it was comparable with the 1954-55 study. With accounts running for 12 months from 500 households, 6,000 separate observations were to be expected. This is to be compared to the 10,000 so-called accounting months on which the urban study was based.

To win the cooperation of the households it was essential that they be approached by an organization with which they were already familiar in connection with their keeping of farm accounts. To maintain this cooperation, current contacts with the households during the accounting period were necessary (at least two visits a month). For properly completed records over the whole 12 months, each cooperating household was offered a modest reward (600 AS).

Table 107 shows the provincial allocation of the sample chosen, as it evolved from the planning stage of 500 households to the tabulation stage of 462 households. At first the cooperation of more farm households were obtained than was originally planned, but there was a quick decline when the first difficulties of keeping accounts became visible. The further loss of 5 percent during the course of the year can be regarded as small. Finally, complete records of 468 households were available. Of these, 6 had to be excluded because they were either extreme with regard to size, level, or expenditure, or their income came from predominantly nonfarm activities.

Tables 108, 109, and 110 present further allocation of the 462 households including the tabulation stage of the study, namely: (1) A provincial distribution in combination with a breakdown by household size or by total expenditure per consumer unit, (2) a production area distribution in combination with a breakdown by household size or by total expenditure groups, and (3) a cross classification of households by household size and level of total expenditure. From these two-dimensional distributions, it is seen that the typical farm household included in the study has four consumer units as its size, and has a level of total expenditure of 8,000-10,000 AS per consumer unit per year.

2.4 Collection and Evaluation of the Data

A monthly household book was kept by each household included in the sample. The first month's books were handed out late in 1958, accompanied by a set of bookkeeping rules. The keeping of the records started on January 1, 1959 and ended December 31, 1959. 39/ When new books were handed out monthly during the year, completed books were collected, and the necessary steps taken to obtain any missing information. Some misunderstandings and problems of a general nature were cleared up by occasional circular letters.

39/ Direct contact with the households was maintained by the statistical groups. These working groups in turn obtained their instructions from the Statistical Department of the Company, to which a monthly report about all activities had to be sent.

After being subjected to suitable control and adjustments (valuation of products taken from the farm and corresponding corrections in the accounts), the results of the monthly books were transcribed in a yearbook which was set up for every household. In this way, the results of the households for the entire year were ready for analysis soon after the end of 1959. This also made it possible to pay the promised rewards to the 468 cooperating households as early as January 25 to March 8, 1960. The yearbooks formed the basis for the preparatory work that preceded the actual tabulation of the data. 40/ In particular, the following pretabulation adjustments and calculations were carried out. (1) The average household size was determined on the basis of so-called "full board days" in order to include in the food balance certain temporarily absent members of the household (i.e., children in boarding schools, persons in hospitals or traveling) and also to exclude nonmembers (i.e., employees, guests). 41/ Also, the cost of food for permanent employees, guests, and those relatives who covered their consumption expenditures from their own incomes, were excluded from the household accounts. 42/

In the items "heating and lighting" and "own traffic facilities," the respective shares going to business and to the household were allowed for in the calculations. In the item "household operation," large-scale repairs and building extensions were reduced in their costs by an appropriate amount. In the item "furniture, furnishing, and household equipment" those sums were excluded which went as inheritance shares or dowry to marrying members of the household, since these cases are more in the nature of an application of business capital than of expenditures for furniture and household equipment for the own household. The item "rent" was specially added. Its size was determined by the area of the living quarters, its state of repair, and the way the rooms were furnished.

(2) For all households, both the actual number of persons and the number of consumer units (CU) were calculated. The tables are all based on the number of consumer units. 43/

40/ This work consisted mainly in certain adjustments, transfer of entries, and the calculation of key numbers and coefficients for each household.

41/ Imputed items of this sort were also used in the 1954-55 Urban Consumption Survey, but they play a much greater role in farm households. Since the size of the households fluctuated in some cases quite considerably within the period of investigation, a count of the number of persons on a single day (or even on a certain day in each of the 12 months) would have led to incorrect results.

42/ The food items were reduced (by quantity and value) in the same ratio as the ratio of full board days of the fully cared-for household members to the total number of full board days. In cases where children attended boarding school, the food expenditure was increased by the corresponding number of full board days while at the same time an equal sum was deducted from the item "education."

43/ For the calculation of consumer units a simple key was used, differentiating between persons by age but not by sex:

Persons 15 years and over = 1 CU
Children from 11 to 14 years = 0.7 CU
Children from 7 to 10 years = 0.5 CU
Children 6 years and below = 0.3 CU

For grouping the households by household size, 6 classes were formed. They are:

Households with 2 consumer units (1.51 - 2.50 CU)
" " 3 " " (2.51 - 3.50 CU)

Continued on following page

Table 107. – Geographical distribution of households in the Farm Consumption Survey of 1959, by Federal Provinces and survey stages, Austria

Federal Province	Number of households at respective progress stages				
	Planned	Ready for cooperation	Cooperating at the end of the first month	Cooperating at the end of the last month	Included in the tabulation
Lower Austria	113	122	98	94	93
Burgenland	35	33	33	26	26
Upper Austria	90	108	107	99	99
Styria	110	111	107	105	105
Carinthia	57	52	49	48	44
Salzburg	41	44	43	39	39
Tyrol	40	44	45	45	45
Vorarlberg	14	13	12	12	11
Total	500	527	494	468	462

(3) As in the Urban Consumption Survey, the total sum of consumption expenditures and not income was taken as a basic variable. The expenditure groups were related to total consumption expenditure per consumer unit 44/ in contrast to the 1954-55 Urban Consumption Survey which used total consumption expenditure per household.

43/ - continued: Households with 4 consumer units (3.51 - 4.50 CU)
" " 5 " " (4.51 - 5.50 CU)
" " 6 " " (5.51 - 6.50 CU)
" " 7 and more CU (6.51 and more CU)

44/ For total expenditure, seven groups (including two open-end classes) were formed with a class interval of AS 2,000. The classes are:

Households with total expenditure of less than 6000 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure from 6000 - 7,999 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure from 8000 - 9,999 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure from 10,000 - 11,999 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure from 12,000 - 13,999 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure from 14,000 - 15,999 Austrian schillings (AS) per consumer unit (CU) per year.
Households with total expenditure of 16,000 - or more Austrian schillings (AS) per consumer unit (CU) per year.

Table 108. —Distribution of households by Federal Provinces and household size, and by federal provinces and expenditure groups, 462 households, Austrian Farm Consumption Survey of 1959

Categories	Total number of households sampled	Number of households sampled in individual provinces							
		Lower Austria	Burgenland	Upper Austria	Styria	Corinthia	Salzburg	Tyrol	Vorarlberg
	Distribution of households by household size								
1.51 - 2.50 consumer units (2 CU)	38	9	2	11	10	3	1	1	1
2.51 - 3.50 " " (3 CU)	109	24	7	30	21	7	7	10	3
3.51 - 4.50 " " (4 CU)	134	26	8	27	35	15	10	12	1
4.51 - 5.50 " " (5 CU)	105	26	1	18	24	12	14	7	3
5.51 - 6.50 " " (6 CU)	45	4	7	10	7	4	3	7	3
6.51 and more " " (7 or more)	31	4	1	3	8	3	4	8	0
Total	462	93	26	99	105	44	39	45	11
	Distribution of households by expenditure groups								
Under 6,000 AS per CU	37	8	3	10	9	2	3	2	0
6,000 - 7,999 " " "	118	17	10	29	28	14	6	12	2
8,000 - 9,999 " " "	120	19	6	20	31	13	12	15	4
10,000 - 11,999 " " "	70	19	4	13	15	6	8	2	3
12,000 - 13,999 " " "	45	11	3	15	10	1	2	3	0
14,000 - 15,999 " " "	35	9	0	5	6	4	4	6	1
16,000 or more " " "	37	10	0	7	6	4	4	5	1
Total	462	93	26	99	105	44	39	45	11

The change in the present study allows us to minimize the effect of a positive correlation between household size and the level of total expenditure.

In addition to the reasons given in the earlier study, 45/ it was realized that it is practically impossible to obtain reliable information about the income of a farm household in connection with an investigation about consumption. To obtain such information, the keeping of special books is necessary. Although all the investigated households were keeping such books and even using the same or similar accounting methods, the final results of the so-called business accounts were not ready when the tabulation of the consumption study was begun. Working in an ex post manner, the presently available data would permit a comparison of the various consumption expenditures not only with their total but also with income (or other variables such as gross income or capital).

(4) In order to carry out the previously mentioned corrections and adjustments in the data, about 250 calculations were required for each yearbook, which means that for the total material about 120,000 calculations were necessary in advance of the tabulation. 46/

2.5 The Inquiry Program

First of all, each household had to fill out a "Questionnaire for Farm Households" in which decisive sample characteristics such as production region, type and size of enterprise, and other structural data 47/ of the household were noted. 48/ The basis for the actual household accounts was the "Farm Household Book" which was exchanged every month. 49/ The layout of the household book was planned along the same lines as applied to Urban Consumption Survey of 1954-55. In particular, the various items were not entered in chronological order but into different accounts. Altogether, 65 accounts were set up for food and 23 accounts for other consumption expenditures.

The entries into the accounts had to be carried out day by day and had to state quantities and expenditures for the food items, and expenditure only for all other consumption items. In the later case, where usually various goods were grouped into one account, the exact nature of the commodity had to be indicated.

45/ "Der Verbrauch der Städtischen Bevolkerung Österreichs," page 5.

46/ Tabulation and post-tabulation computations were much more extensive. For example, the calculation of demand elasticities by means of double-logarithmic multiple regression equation for Chapter VIII required about 70,000 equations which had to be fed into an electronic computer Z use Z 22.

47/ Installation of electrical appliances, as well as water and bathroom housing conditions, pattern of land use, energy requirements.

48/ This basic form was also used to record the stocks of food and fuel at the beginning (January 1, 1959) and the end (December 31, 1959) of the accounting period. Any differences between stocks at the beginning and at the end of the year were added to consumption when they were positive and deducted when they were negative.

49/ On an introductory page, the composition of the farm household in the respective month had to be entered with additional information about guests and employees who took their meals in the household and about members of the household who were absent but cared for by the household. This information was used for calculating full board days and household size.

Most of the accounts contained a subdivision between goods which were purchased or required some other sort of money expenditure, and those which entered the household without any payments, which as a rule meant that they came from the household farm, (gifts, etc. were also included in this category). These withdrawals in kind were only entered by quantity and were later valuated by the regional offices of the Agricultural Accounting Company at producer prices. A single average price for the whole year of 1959 was used without any regional differentiation. Produce returned by the milk delivery centers, sugar factories, etc., were valuated at the return delivery price.

While withdrawals in kind were the exception in the investigation of city households (e.g., from small gardens or own shops), they were the rule in farm households. The accounts had, therefore, to be kept with particular care; this problem was kept in mind when the household books were planned, in the explanations accompanying the book, and later on when the items were controlled and manipulated. In order to obtain complete records and to avoid double entries, special cases had to be worked out with particular care. 50/

In accordance with the definitions of national income statistics, services rendered within the household were neglected. Food processed in the household (e.g., self-made cakes, spirits, etc.) was, therefore, not entered at its final value, but was broken down into its component parts (withdrawals in kind or purchased materials) and entered at their respective prices. It is doubtful whether it would have been possible to obtain the necessary calculations and adjustments, if the households had not already been familiar with similar problems from their previous accounting experience.

2.6 Interpretation of Results

As was mentioned before, the investigation was not based on a random sample. It was, therefore, not possible to evaluate the sampling error or to draw any conclusions from nonrespondence. But it can be shown that the households were not chosen in a biased way, being regionally distributed by size of household and expenditure groups. From the changes in expenditure structures, with the size of households on the one hand and expenditure groups on the other, it can be demonstrated that the results are plausible. This implicit criterion was also most important for judging the validity of the results of the investigation of consumption in city households.

A criterion is presented in tables 111 and 112, where the influence of the two variables mentioned on the structure of expenditure is shown.

There is no clear-cut influence of household size on the structure of expenditure, probably because growing households and increasing incomes tend to balance out opportunities for economizing (economies of scale). The influence of expenditure groups on the structure of consumption, however, is very clearly visible. The share of food expenditure in total expenditure falls from group to group in accordance with Engel's law. The changes in the percentage shares of most of the other consumption items were also characteristically (though not always continuously) influenced by the expenditure groups.

50/ Exchange of grain against bread, exchange of flour against bread, use of flour for home-baked bread.

Table 109.—Distribution of households by production regions and household size, and by production regions and expenditure groups, 462 households, Austrian Farm Consumption Survey of 1959

Categories	Total number of households sampled	Number of households sampled in individual production regions							
		North-eastern plains and hills	South-eastern plains and hills	Sub-alpine region	Carinthian Valley	Wald and Mühlviertel	Northern pre-alpine regions	Eastern pre-alpine regions	Alpine regions
		Distribution of households by household size							
1.51 - 2.50 consumer units (2 CU)	38	3	4	11	1	4	4	9	2
2.51 - 3.50 " " (3 CU)	109	8	19	27	0	19	10	10	16
3.51 - 4.50 " " (4 CU)	134	10	25	27	7	14	8	15	28
4.51 - 5.50 " " (5 CU)	105	8	13	20	8	10	13	10	23
5.51 - 6.50 " " (6 CU)	45	2	7	6	0	6	5	6	13
6.51 and more " " (7 or more CU)	31	1	2	3	1	0	5	4	15
Total	462	32	70	94	17	53	45	54	97
		Distribution of households by expenditure groups							
Under 6,000 AS per CU	37	1	9	4	0	9	5	2	7
6,000 - 7,999 " " "	118	11	21	16	4	19	9	17	21
8,000 - 9,999 " " "	120	7	19	20	4	9	10	16	35
10,000 - 11,999 " " "	70	3	10	20	3	7	8	6	13
12,000 - 13,999 " " "	45	3	4	16	0	7	4	5	6
14,000 - 15,000 " " "	35	1	3	9	4	1	3	4	10
16,000 or more " " "	37	6	4	9	2	1	6	4	5
Total	462	32	70	94	17	53	45	54	97

Table 110.— Distribution of households, by household size and expenditure group, 462 households, *Austrian Farm Consumption Survey of 1959*

Household size in Consumer Units	All households sampled	Expenditure group in A. schillings per CU per year Under 6,000	6,000-7,999	8,000-9,999	10,000-11,999	12,000-13,999	14,000-15,999	16,000 or more
	Number of households							
1.51 - 2.50 consumer units (2 CU)	38	0	6	11	5	7	5	4
2.51 - 3.50 " " (3 CU)	109	4	22	19	20	16	12	16
3.51 - 4.50 " " (4 CU)	134	14	32	34	21	14	11	8
4.51 - 5.50 " " (5 CU)	105	5	24	37	15	8	7	9
5.51 - 6.50 " " (6 CU)	45	7	23	10	5	0	0	0
6.51 and more " " (7 or more CU)	31	7	11	9	4	0	0	0
Total all households	462	37	118	120	70	45	35	37
	Percentage distribution of each size group by expenditure level							
1.51 - 2.50 consumer units (2 CU)	100	0	16	29	13	18	13	11
2.51 - 3.50 " " (3 CU)	100	4	20	17	18	15	11	15
3.51 - 4.50 " " (4 CU)	100	10	24	26	16	10	8	6
4.51 - 5.50 " " (5 CU)	100	5	23	35	14	8	7	8
5.51 - 6.50 " " (6 CU)	100	16	51	22	11	0	0	0
6.51 and more " " (7 or more CU)	100	23	35	29	13	0	0	0
All households	100	8	26	26	15	10	7	8
	Percentage distribution of each expenditure group by household size							
1.51 - 2.50 consumer units (2 CU)	8	0	5	9	7	16	14	11
2.51 - 3.50 " " (3 CU)	23	11	19	16	29	35	34	43
3.51 - 4.50 " " (4 CU)	29	38	27	28	30	31	31	22
4.51 - 5.50 " " (5 CU)	23	13	20	31	21	18	20	24
5.51 - 6.50 " " (6 CU)	10	19	20	8	7	0	0	0
6.51 and more " " (7 or more CU)	7	19	9	8	6	0	0	0
	100	100	100	100	100	100	100	100

Some of the main difficulties of the Urban Consumption Study were not relevant to the present study. 51/ On the other hand, some specific difficulties were encountered in the study of farm households which had not been encountered in the other study, involving problems in keeping a clear division between household expenditure and business expenditure, 52/ problems in the keeping of accurate records about withdrawals, and problems in the valuation of such withdrawals.

Budgeting for withdrawals of farm-produced goods for farm household consumption was simple as long as the goods were withdrawn continually and in a finished state(fresh eggs). When, however, goods were further processed inside or outside the household (fruit such as self-made jam, or flour such as bread from the baker) or taken from stocks (after slaughters, preserved eggs), then complicated budgeting rules were necessary and considerable care was used to see that they were properly kept.

In valuing farm-food withdrawals at farm prices instead of at retail prices, the level of total expenditure (and for food) has likely been underestimated. An additional factor is that in comparison to urban households, goods are usually processed further in farm households. In spite of increasing contacts with the market, farm households are still more restricted in their choice than the city household and the goods processed and consumed by them are often of a lower quality and without any comparable market price. Because of these problems, it is not possible to compare the living standards of urban and farm households by simply revaluing the farm-food withdrawals at retail prices instead of at farm-level prices. For such a comparison, it would be necessary to consider the basic structural differences between farm households and urban households, many of which cannot be completely reduced to quantitative terms.

51/ E.g., differentiation of the households by social status (worker, salaried and government employees, self-employed persons, old-age pensioners, etc.), and the inclusion of so-called supplementary budgets.
52/ E.g., in the case of means of transportation, electricity for lights, meals for members and non-members of the household.

Table 111. - Distribution of consumption expenditures per consumer-unit per year by household size and by major items in household budget, 462 households, *Austrian Farm Consumption Survey of 1959*

Item	All households sampled	Household size in consumer units (CU)					
		1.51 - 2.50	2.51 - 3.50	3.51 - 4.50	4.51 - 5.50	5.51 - 6.50	6.51 or more
Number of households	462	38	109	134	105	45	31
Number of persons per household	5.2	2.5	3.8	5.1	6.0	6.9	8.8
Number of consumer units per household	4.3	2.2	3.0	4.0	5.0	6.0	7.5
Consumption expenditure per consumer unit per year (in AS)	10,099	11,557	11,600	9,815	10,107	7,727	7,678
	Percent of expenditure on:						
Food	44.0	38.8	40.0	45.9	45.6	51.8	46.6
Tobacco products	0.8	0.7	1.0	0.8	0.8	0.8	0.9
Rent	3.8	5.2	3.9	3.8	3.5	3.7	2.9
Household operation and cleaning	2.7	2.1	2.9	2.5	2.5	1.8	5.5
Furniture and furnishings	4.1	4.2	5.7	3.6	3.7	2.6	2.5
Household equipment	2.4	2.4	3.3	1.7	2.2	2.6	1.6
Lighting and heating	6.0	8.5	6.7	5.9	4.8	5.0	4.4
Clothing	9.4	8.1	9.1	9.6	9.6	8.9	11.3
Shoes	2.9	2.3	2.9	2.8	3.0	3.0	4.0
Household garments	1.1	1.0	1.2	0.9	1.1	1.0	1.2
Laundering	1.1	1.4	1.0	1.0	1.2	1.3	1.4
Medical care	3.6	4.5	3.1	3.9	3.5	3.0	3.2
Cosmetics	0.8	0.7	0.7	1.0	0.7	0.5	0.4
Education	2.3	1.9	1.9	2.3	2.6	2.8	3.0
Recreation	1.9	1.7	2.3	2.0	1.7	1.6	0.9
Automobile	4.3	7.3	5.3	3.6	3.8	2.5	2.7
Other transporation	1.0	0.7	0.9	1.0	1.0	1.2	1.1
Contributions (gifts and donations)	2.3	2.8	2.3	2.4	2.3	1.6	1.6
Membership dues	0.9	1.3	1.0	0.7	0.8	0.8	0.6
Domestic services	1.0	0.9	1.2	1.0	1.2	0.4	0.3
Other expenditures	3.7	3.2	3.6	3.7	4.2	3.0	3.9
Total consumption expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 112. – Distribution of consumption expenditures per consumer unit per year, by expenditure levels and by major items in household budget, 462 households, Austrian Farm Consumption Survey of 1959

Item	All households sampled	Under 6,000	Expenditure group in A. schillings per CU per year					
			6,000-7,999	8,000-9,999	10,000-11,999	12,000-13,999	14,000-15,999	16,000 or more
Number of households	462	37	118	120	70	45	35	37
Number of persons per household	5.2	5.9	5.4	5.4	5.1	5.0	4.2	4.9
Number of consumer units per household	4.3	4.9	4.7	4.4	4.1	3.6	3.6	3.6
Consumption expenditures per consumer unit per year (in AS)	10,099	5,363	7,114	8,906	10,934	12,911	14,802	18,771
	Percent of expenditures on:							
Food	44.0	60.8	55.6	49.4	43.7	38.7	37.0	27.1
Tobacco products	0.8	0.6	0.9	0.9	0.9	0.6	0.6	1.0
Rent	3.8	4.0	3.9	4.0	3.4	4.1	4.2	3.5
Household operation and cleaning	2.7	2.3	1.4	2.6	2.2	2.9	2.4	5.0
Furniture and furnishing	4.1	1.0	1.8	2.8	4.1	4.3	7.4	7.5
Household equipment	2.4	0.7	1.4	1.9	2.7	2.4	2.5	4.3
Lighting and heating	6.0	7.0	6.1	5.9	5.7	6.7	5.9	5.4
Clothing	9.4	6.8	8.9	9.7	10.3	9.4	9.4	9.1
Shoes	2.9	3.0	3.0	3.0	3.1	2.7	2.7	2.8
Household garments	1.1	0.6	1.0	1.3	0.9	1.1	1.4	0.9
Laundering	1.1	0.9	1.1	1.1	1.0	1.5	1.4	1.0
Medical care	3.6	2.7	2.6	3.2	3.5	4.2	4.3	4.5
Cosmetics	0.8	0.4	0.6	0.6	0.7	1.2	0.8	0.9
Education	2.3	2.1	2.0	2.1	3.0	2.2	2.5	2.1
Recreation	1.9	1.0	1.4	1.5	2.1	1.9	2.2	3.0
Automobile	4.3	1.1	1.4	2.7	4.7	6.2	3.8	9.7
Other transportation	1.0	1.0	1.0	1.0	1.0	0.9	1.3	0.7
Contributions (gifts and donations)	2.3	0.9	1.5	2.0	2.2	2.9	3.0	3.0
Membership dues	0.9	0.8	0.7	0.8	0.8	1.0	1.0	1.1
Domestic services	1.0	0.2	0.2	0.5	0.4	1.3	1.7	2.7
Other expenditures	3.7	2.2	3.4	3.0	3.8	3.7	4.6	4.8
Total consumption expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

VIII. DEMAND FOR FOOD AND TOBACCO: METHODOLOGY AND PROJECTIONS

In this chapter, attention is focused on (a) the statistical methodology involved in obtaining suitable elasticity coefficients for important food and tobacco commodities, (b) the tracing back of important changes in demand over the past decade to changes in real income as well as to changes in real prices and structural changes, and (c) the projection of food and tobacco consumption until 1975.

The present analysis is based on sample surveys and on time series of food consumption. It draws on the material in the preceding chapter for background information. It looks at both the quantity and quality of important consumer goods and how these are being influenced by various factors.

1. Econometric Analysis of Demand for Food and Tobacco

The results of the "Urban Consumption Survey of 1954/55" and of the "Farm Consumption Survey of 1959" provide estimates on expected changes in the consumption of, and expenditure for, various food commodities as a result of rising incomes. Also, the influence of household size on consumption is evaluated in terms of elasticities in relation to household size. The development of consumption over time is explained by total expenditure as well as by disposable income. Occasionally, the explanatory variables will include also the price of the commodity in question (elasticity in relation to own price), the price of a substitute (cross-price elasticity), and a trend variable.

1.1 Evaluation of the Urban Consumption Survey 1954/55

For the purposes of demand analysis two different evaluations of the urban budget survey are available: 53/

(i) All 7,019 households included in the Urban Consumption Survey were grouped according to the level of consumption as determined by total expenditure per household, but not cross-classified by household size and total expenditure.

(ii) A sample of 6,023 households from the Urban Consumption Survey were cross-classified by household size and total expenditure.

In both evaluations total expenditure was subdivided into 23 expenditure groups with food as one of these groups. The food group is further broken down into 62 individual food commodities (both in terms of quantities consumed and expenditure) for only the first evaluation.

53/ Der Verbrauch der städtischen Bevölkerung Österreichs, Forschungsstelle zur Aufstellung volkswirtschaftlicher Bilanzen, Vienna, 1956.

An extensive econometric treatment of the material has been worked out by Gerhard Tintner, in cooperation with the Austrian Institute of Economic Research. 54/ On the basis of the data of all 7,019 households as described above, estimates of the expenditure elasticities were derived for all 22 expenditure groups. For the 62 food commodities or groups of food commodities, expenditure as well as quantity elasticities in relation to total expenditure were computed. For the expenditure groups and for selected food commodities separate estimates were calculated on the basis of data stratified by the social status of household heads, categorized as self-employed, officials and clerical employees, manual workers, people receiving pensions or retirement payments, and manual workers. By means of an analysis-of-variance test it was shown, however, that the social status of the household heads generally has no significant influence on the level and the slope of the Engel curve; it can therefore be neglected.

The elasticity coefficients were estimated by fitting double-logarithmic equations for expenditure on (1) and quantities of food commodities (2):

$$\log Y_i = k + b_i \log X + u_i \qquad (1)$$

$$\log Q_i = k' + b_i' \log X + u_i' \qquad (2)$$

Here, Y_i denotes per capita expenditure on the i-th commodity, Q_i the quantity consumed, and X total expenditure per capita; b_i and b_i' are the estimated values of the expenditure and quantity elasticities in relation to total expenditure; u_i and u_i' denote the random disturbances of the functions with zero mean and constant finite variance. Per capita figures were obtained by dividing the average amounts spent per household within the various levels of consumption by the corresponding average number of household members. In order to take account of sampling errors the individual observations were weighted by the number of households in the corresponding expenditure group. The influence of household size on per capita consumption could not be taken into account because data cross-classified by household size and expenditure groups were lacking. The results for food and tobacco products are summarized in tables 113 and 114.

The elasticity coefficients computed by the method described have a downward bias. There are several reasons for this. In general, consumption of a certain food item increases with rising levels of total expenditure (positive partial elasticity in relation to total expenditure) and with decreasing household size (negative partial elasticity in relation to household size). If the influence of household size is neglected and a simple regression of per capita consumption on total expenditure is computed, the elasticities in relation to total expenditure would represent unbiased estimates only if there were no inter-dependence whatsoever between the two determining variables (total expenditure and household size). Actually, the data are grouped in such a way that increasing levels of total expenditure per capita are associated with increasing average household size. In this case, simple regressions yield elasticities in relation to total expenditure which are too low, since the higher level of consumption in the upper expenditure groups is attributed entirely to higher total expenditure whereas it actually is the result of two factors working in opposite directions (i. e., higher consumption due to higher total expenditure and lower consumption due to larger average household size).

54/ Einkommenselastizitäten im österreichischen Konsum. Beilage Nr. 57 zu den Monatsberichten des Österreichischen Institutes fur Wirtschaftsforschung, Vienna, 1959.

Table 113. – Proportion of food expenditure and parameter estimates of expenditure elasticities of demand in relation to total expenditure, for food and tobacco, by commodities, 7,019 households, Austrian Consumption Survey of 1954/55

Commodities	Proportion spent 1/	Parameter estimates			
	Percent	Elasticity b	Standard error s_b	Coefficient of determination r^2	Student's t-Test t_b
Total food expenditure	100.0	0.461	0.011	0.991	43.488***
Cereal products					
White bread	3.74	0.151	0.042	0.556	3.582**
Brown bread	4.33	-0.082	0.038	0.321	-2.148
Other bread	0.23	0.802	0.082	0.904	9.751***
Cakes, Pastries, etc.	1.23	1.178	0.083	0.954	14.192***
Wheat flour	2.40	-0.120	0.036	0.528	-3.312**
Other flour	0.07	1.044	0.449	0.351	2.326*
Macaroni, noodles, etc.	1.27	0.224	0.028	0.861	8.084***
Rice	1.11	0.120	0.087	0.158	1.377
Maize products	0.18	-0.034	0.092	0.013	-0.369
Semolina	0.42	-0.029	0.092	0.009	-0.313
Other cereals	0.29	0.671	0.131	0.723	5.127***
Meat and fish					
Beef	3.79	0.408	0.049	0.875	8.338***
Pork	5.18	0.109	0.065	0.214	1.665
Mutton and goat meat	0.17	0.148	0.226	0.041	0.655
Veal	2.38	0.575	0.049	0.930	11.698***
Horse meat	0.28	-0.193	0.194	0.904	0.997
Ham	2.19	0.694	0.133	0.728	5.203***
Bacon	0.67	0.476	0.109	0.658	4.385**
Sausages	5.47	0.566	0.099	0.763	5.701***
Canned meat	0.19	0.433	0.132	0.520	3.288**
Poultry and game	1.08	1.426	0.201	0.833	7.105***
Ground meat	0.96	0.196	0.059	0.513	3.303**
Offals	0.94	0.628	0.094	0.817	6.666***
Bones	0.45	0.267	0.089	0.401	3.004*
Fresh fish, shell animals	0.61	0.505	0.068	0.845	7.433***
Canned fish	0.58	0.953	0.120	0.861	7.919***

Table 113. - Proportion of food expenditure and parameter estimates of expenditure elasticities of demand in relation to total expenditure, for food and tobacco, by commodities, 7,019 households, Austrian Consumption Survey of 1954/55 - Continued

Commodities	Proportion spent 1/	Parameter estimates			
		Elasticity b	Standard error s_b	Coefficient of determination r^2	Student's t-Test t_b
	Percent				
Fats and oils (excl. butter)					
Lard	1.89	0.047	0.033	0.177	1.443
Back fat	0.98	-0.165	0.078	0.314	-2.130
Margarine	1.08	-0.002	0.062	0.000	-0.032
Vegetable fats	0.21	0.434	0.097	0.667	4.480**
Edible oils	1.79	0.161	0.031	0.721	5.109***
Dairy products and eggs					
Whole milk, fresh	6.63	-0.019	0.019	0.087	-1.007
Skim milk	0.02	0.573	0.664	0.001	0.086
Other milk	0.29	0.596	0.119	0.703	5.003***
Cream	0.47	0.987	0.118	0.875	8.389***
Cheese	1.34	0.689	0.080	0.879	8.588***
Cottage cheese	0.26	0.064	0.069	0.080	0.928
Butter	4.82	0.675	0.039	0.969	17.497***
Eggs	3.92	0.280	0.043	0.811	6.531***
Vegetables and fruit					
Fresh and frozen vegetables	3.94	0.297	0.005	0.997	64.546***
Potatoes	1.90	0.201	0.063	0.506	3.203*
Pulses	0.27	0.074	0.132	0.031	0.562
Southern fruit	1.76	0.881	0.167	0.734	5.264***
Other fresh fruit	3.51	0.591	0.038	0.960	15.568***
Canned fruit and vegetables	0.56	1.227	0.129	0.899	9.486***
Nuts, poppy, etc.	0.49	1.047	1.099	0.083	0.953
Sugar and related products					
Sugar	3.73	0.060	0.150	0.617	0.402
Syrup, honey substitute, etc.	0.19	1.278	0.230	0.755	5.561***
Bee honey	0.59	0.777	0.104	0.848	7.497***
Jam, marmalade	0.42	0.918	0.126	0.842	7.305***
Candies	0.65	0.932	0.117	0.862	7.964***

Table 113. - Proportion of food expenditure and parameter estimates of expenditure elasticities of demand in relation to total expenditure, for food and tobacco, by commodities, 7,019 households, Austrian Consumption Survey of 1954/55 - Continued

Commodities	Proportion spent 1/ Percent	Parameter estimates			
		Elasticity b	Standard error s_b	Coefficient of determination r^2	Student's t-Test t_b
Coffee, tea and cocoa					
Bean coffee	1.81	0.855	0.068	0.941	12.553***
Coffee substitutes	0.81	-0.320	0.096	0.526	-3.337**
Tea and substitutes	0.35	0.573	0.075	0.851	7.644***
Cocoa	0.48	0.369	0.110	0.527	3.342**
Chocolate	1.02	1.500	0.139	0.921	10.806***
Beverages					
Non-alcoholic beverages	0.34	1.176	0.138	0.880	8.535***
Wine	2.02	1.342	0.070	0.973	19.075***
Beer	2.07	0.696	0.200	0.548	3.481**
Liqueurs, brandies, etc.	1.18	0.996	0.112	0.888	8.906***
Other alcoholic beverages	0.24	0.484	0.220	0.325	2.201
Other					
Other food, ingredients	1.81	0.350	0.048	0.845	7.336***
Meals outside the home	6.45	1.197	0.116	0.914	10.306***
Tobacco products and supplies	-	0.882	0.230	0.595	3.839**

1/ Arithmetic mean of all 7,019 households.

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.

Table 114. – Per capita food consumption per month and parameter estimates of quantity elasticities of demand in relation to total expenditures, for food, by commodities, 7,019 households, Austrian Urban Consumption Survey 1954/55

Commodities	Per capita consumption per month in kilograms 1/	Parameter estimates			
		Elasticity b'	Standard error $s_{b'}$	Coefficient of determination r^2	Student's t-Test $t_{b'}$
Cereal products					
White bread	1.17	0.155	0.042	0.581	3.723**
Brown bread	4.53	-0.082	0.040	0.296	-2.049
Other bread	0.14	0.631	0.106	0.780	5.956***
Cakes, pastries, etc.	0.20	1.045	0.082	0.942	12.693***
Wheat flour	2.06	-0.136	0.038	0.567	-3.615**
Macaroni, noodles etc.	0.44	0.121	0.039	0.489	3.094**
Maize products	0.17	-0.024	0.084	0.008	-0.288
Semolina	0.31	-0.095	0.100	0.082	-0.944
Other cereals	0.07	0.560	0.141	0.610	3.959**
Meat					
Beef	0.58	0.343	0.046	0.847	7.429***
Pork	0.73	0.091	0.070	0.145	1.300
Mutton and goat meat	0.04	-0.088	0.245	0.013	-0.358
Veal	0.33	0.525	0.045	0.931	11.660***
Horse meat	0.06	-0.395	0.196	0.349	-2.014
Ham	0.26	0.583	0.137	0.643	4.245**
Bacon	0.09	0.354	0.097	0.570	3.643**
Sausages	0.83	0.369	0.091	0.620	4.040**
Canned meat	0.04	0.164	0.108	0.188	1.521
Poultry and game	0.18	1.280	0.213	0.783	6.002***
Ground meat	0.15	0.150	0.055	0.425	2.717*
Offals	0.17	0.421	0.080	0.734	5.257***
Bones	0.26	0.137	0.087	0.200	1.582
Fats and oils (excl. butter)					
Lard	0.45	-0.004	0.031	0.002	-0.125
Back fat	0.21	-0.183	0.075	0.372	-2.432*
Margarine	0.29	-0.010	0.066	0.002	-0.146
Vegetable fats	0.05	0.330	0.116	0.447	2.840*
Edible oils	0.40	0.091	0.031	0.466	2.954*

Table 114. - Per capita food consumption per month and parameter estimates of quantity elasticities of demand in relation to total expenditures, for food, by commodities, 7,019 households, Austrian Urban Consumption Survey 1954/55 - Continued

Commodities	Per capita consumption per month in kilograms 1/	Parameter estimates			
		Elasticity b'	Standard error $s_{b'}$	Coefficient of determination r^2	Student's t-Test $t_{b'}$
Dairy products and eggs					
Whole milk, fresh (liters)	11.26	-0.034	0.020	0.230	-1.729
Other milk (liters)	0.28	0.626	0.124	0.718	5.042***
Cream (liters)	0.14	0.626	0.109	0.769	5.765***
Cheese	0.20	0.633	0.077	0.872	8.252***
Cottage cheese	0.13	-0.010	0.061	0.003	-0.166
Butter	0.47	0.655	0.038	0.967	17.074***
Eggs (number)	13.92	0.246	0.061	0.618	4.022**
Vegetables and fruit					
Fresh and frozen vegetables	3.20	0.127	0.023	0.754	5.538***
Potatoes	6.01	0.206	0.080	0.399	2.575*
Pulses	0.13	0.047	0.142	0.011	0.333
Southern fruit	0.71	0.854	0.064	0.946	13.277***
Other fresh fruit	3.19	0.606	0.052	0.932	11.689***
Nuts, poppy, etc.	0.08	1.220	0.126	0.903	9.675***
Sugar and related products					
Sugar	2.10	0.058	0.020	0.465	2.945*
Syrup, honey substitute, etc.	0.03	1.219	0.331	0.575	3.680**
Bee honey	0.08	0.749	0.107	0.831	7.003***
Jam, marmalade	0.11	0.965	0.161	0.783	6.011***
Candies	0.10	0.638	0.098	0.808	6.484***
Chocolate	0.08	1.456	0.196	0.847	7.439***
Beverages					
Wine (liters)	0.44	1.227	0.095	0.943	12.864***

1/ Arithmetic mean of all 7,019 households.

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.

These interrelationships may be explained more clearly by graphical presentation. On a double-log scale, the respective Engel curves of the various household sizes form a set of nearly parallel straight lines with a common slope, but with different distances from the X-axis. The parallel lines mean that there is no significant difference between the elasticities in relation to total expenditure; the different intercepts mean that smaller households usually have a higher "consumption level" than larger ones. Average consumption expenditure derived from non-cross-classified data lie on a relatively high "consumption level" in the case of households in low total expenditure brackets, due to the prevalence of small households. Correspondingly, in higher income brackets the averages obtained lie on a lower "consumption level" as a result of the predominance of larger households. If a regression of the averages lying on different "consumption levels" on total expenditure is computed, the slope of the resulting Engel curve is less steep than that of the unbiased Engel curves referring to the individual household sizes.

x = total expenditure per capita

y_i = per capita expenditure on the i-th item

b_j = Engel curves of the various household sizes ($j = 1, 2, \dots 4$)

b_a = Engel curve with the true average elasticity

b_o = Engel curve with the biased average elasticity

Unbiased elasticities of the total demand for food commodities can be derived from the sample fraction composed of 6,023 households which has been cross-classified by the level of expenditure and by household size. Since both of the determining variables show enough independent variation the following regression equation yields unbiased estimates of the "true" parameters of the function which corresponds to our expectations:

$$\log Y = a + b_a \log X + c \log Z + v$$

Here, Y and X denote food expenditure and total expenditure per capita, and Z household size expressed by the number of persons. No distinction was made between adults and children. The computation yielded a partial elasticity in relation to total expenditure of $b_a = 0.558$; it is higher than the elasticity derived from non-cross-classified data of $b = 0.461$. The partial elasticity in relation to household size was found to be $c = -0.079$. A regression of food expenditure on total expenditure per capita, disregarding the stratification according to household size, according to the equation

$$\log Y = a' + b_o \log X + v' \qquad (4)$$

yielded an elasticity of $b_o = 0.582$. This value somewhat overestimates the "true" elasticity, because in the cross-classified data there is a negative relationship between household size and total expenditure per capita.

Similar computations were carried out by H. S. Houthakker and L. M. Goreux. Houthakker 55/ estimated the partial elasticities of total food demand in relation to total expenditure and household size according to the equation

$$\log Y_i = \alpha_i + \beta_i \log X_1 + \gamma_i \log X_2 + \varepsilon_i \qquad (5)$$

In this formula, Y_i denotes expenditure on food, X_1 total expenditure per household and X_2 household size. He derived estimates of the elasticities in relation to total expenditure (β) and household size (γ) of $b^* = 0.554$ and $c^* = 0.351$. Between the elasticity of household size $\underline{c}$ derived from equation (3) which refers to consumption per capita and $\underline{c}^*$ from equation (5) which refers to consumption per household, there exists the relationship

$$c = c^* + b^* - 1 = -0.081 \qquad (6)$$

This value corresponds closely to the coefficient $c = -.079$ derived from equation (3). In order to take account of differences arising from computing techniques, the values $b^* + 0.551$ and $c^* = 0.362$ as founc by our calculations were inserted into the above formula.

L. M. Goreux converted the cross-classified data of 6,023 households into per capita values, computed double-logarithmic Engel curves separately for each household size and evaluated the results by covariance analysis. 56/

Since the respective elasticities of total food demand in relation to total expenditure (b_j) did not differ significantly from each other, yet the distances from the X-axis ("consumption level") differed according to household size, a "true" average elasticity of $b_a^+ = 0.554$ was selected (average of all b_j weighted with the respective variances).

The multiple regression method according to equation (3) and the covariance analysis yielded almost identical results ($b_a = -.558$, $b_a^+ = 0.554$). The covariance analysis, however, is preferable because it also takes account of household composition (adults and children).

The difference between the estimated elasticity of total food demand in relation to total expenditure which has been derived from the non-cross-classified total sample of 7,017 households ($b = 0.46$), and the elasticity derived from the cross-classified data of the sample fraction of 6,023 households ($b_a = 0.56$, $b_a^+ = 0.55$) is that in the first case size and composition of households had to be neglected. The different number of households evaluated does not account for the gap between the results, for if the rest of the households are included the results of the multiple regression and covariance analyses remain unchanged. The following shows the elasticities of total food demand for all household sizes (more precisely: all types of household composition) derived from the cross-classified data of the total sample:

55/ Houthakker, H. S., An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law, Econometrica, Vol. 25, No. 4, Oct. 1957.
56/ Gordeux, L. M., Income Elasticity of the Demand for Food UN Economic Commission for Europe, Agr. working party, 7/2, June 1959.

Stratum	Household type	Number of households	b_j
I	1 adult	1,124	0.576
II	2 adults	1,917	0.555
III	2 adults and 1 child (below 14 yrs.)	998	0.560
IV	2 adults and 2 children	471	0.435
V	3 adults	808	0.540
VI	3 adults and 1 child	433	0.505
VII	4 adults	272	0.464
VIII	1 adult and 1 or more children	172	0.507
IX	2 adults and 3 or more children	179	0.599
X	3 adults and 2 or more children	219	0.524
XI	4 adults and 1 or more children	254	0.533
XII	Others	172	0.551
		7.019	
	"True" average elasticity	$b_a^+ =$	0.544

The computation of unbiased elasticities for individual food commodities by multiple regression or covariance analysis is not possible because the cross-classified sample fraction of 6,023 households is classified only by expenditure groups. A regrouping of the basic material of the Urban Consumption Survey of 1954/55 in line with the desired classification scheme would, however, be too time consuming and the improved results would not justify the cost involved.

Houthakker and Goreux suggested an adjustment of the biased estimates of the elasticities in relation to total expenditure by the formula

$$b_a^* = b_o - cd \qquad (7)$$

Here, b_a^* denotes the "true" elasticity, b_o the empirical elasticity which is biased due to the effect of household size, c the known or assumed demand elasticity of the respective commodity in relation to household size, and d the elasticity of household size in relation to total expenditure. The elasticity of household size in relation to total expenditure per capita was estimated to be d = 0.84 on the basis of the non-cross-classified total sample according to the equation

$$\log Z = k'' + d \log X + u'' \qquad (8)$$

The expenditure elasticity of total food consumption in relation to household size ($c = -0.079$) is known from the multiple regression analysis according to equation (3). If the biased elasticity of total food demand b = 0.46 is adjusted, the value $b_a^* = 0.53$ is obtained as follows:

$$b_a^* = 0.46 - (-0.079)(0.84) = 0.53$$

The adjusted value just obtained corresponds closely to the unbiased elasticities $b_a = 0.56$ computed by multiple regression and $b_a^+ = 0.55$ computed by covariance analysis.

The adjustment factor for the non-cross-classified total sample cd = +0.07, is however, only valid for total food consumption. The coefficient d remains unchanged for all commodities because it measures the quantitative relation between the independent variables (household size and level of expenditure). The partial elasticity of demand in relation to household size (c), though, differs between the individual commodities. It can be positive as well as negative because it represents the net effect of two counteracting factors. First, with increasing household size a reduction of per capita expenditure on the i-th commodity is made possible due to the specific economies of scale (α_i):

$$d\ (\log Y_i) = \bar{\alpha}_i\ d\ (\log Z) \qquad (9)$$

The coefficient α_i depends on the possibilities for economizing, which go along with increasing household size, and varies, therefore, from commodity to commodity. It will be rather high for rent as well as for heating and lighting, but probably very low for clothing and meals taken outside the home.

Second, for total consumption expenditure there exists an overall effect (α) for all consumption groups resulting from the summation of the specific economies of scale:

$$\alpha = \frac{\Sigma\ \alpha_i\ Y_i}{\Sigma\ Y_i} \qquad (10)$$

With increasing household size, per capita total expenditure could be reduced by the value of α without leaving the individual household members worse off than before:

$$d\ (\log X) = \bar{\alpha}\ d\ (\log Z) \qquad (11)$$

However, since per capita total expenditure is held constant the "standard of living" is raised by approximately + $\alpha\ d\ (\log Z)$. As a consequence of this "income effect", expenditure of b_i will increase according to the expression:

$$d\ (\log Y_i) = b_i\ \alpha\ = b_i\ \alpha\ \ d\ (\log Z) \qquad (12)$$

If per capita expenditure is kept constant while the household size varies, the change in the consumption of the i-th commodity is given by the combination of the "specific effect" and the "income effect" of economies of scale-equations (9) and (12):

$$d\ (\log Y_i) = (\ \alpha b_i\ -\ \alpha_i)\ d(\log Z) \qquad (13)$$

The expenditure elasticity in relation to household size can, therefore, be expressed as follows:

$$c_i = \alpha\, b_i - \alpha_i \qquad (14)$$

Generally, these two factors have the opposite sign. The demand elasticity in relation to household size is, therefore, positive if the income effect ($\alpha\ b_i$) predominates, and negative if the specific economies of scale (α_i) prevail.

The elasticity in relation to household size presumably shows considerable differences between commodities, even if the same α_i was assumed for all food commodities, the dependence from the elasticity in relation to total expenditure b_i would already cause considerable differences. The correction factor for total food demand cd = 0.07 can only be used in a very limited sense for adjusting the biased elasticities of individual food items. The analysis of consumption was, therefore, based mainly on the coefficients derived by Tintner. However, in interpreting the elasticities and using them for projections, they were found to be somewhat underestimated. In some cases the elasticities in relation to household size which were derived from the Farm Consumption Survey of 1959 were used for adjustment purposes. But an overall modification with the help of these coefficients seemed to be highly questionable because of the differences in consumption patterns.

1.2 Evaluation of the Farm Consumption Survey 1959 57/

The Farm Consumption Survey of 1959 which was carried out within the framework of the present research project furnished complete consumption records of 462 farm households. Expenditure and quantities consumed were expressed as data per consumer unit per year, and household size was measured by consumer units. The data were grouped by household size and within each household size by the level of total expenditure. 58/

The econometric analysis was based on the consumption data of the individual households. For computational work an electronic computer (Zuse Z 22) was employed. For each of the 462 households a summary sheet was developed containing certain key figures for the identification and characterization of the household (ordering number, acreage, number of physical persons, consumer units, production region, etc.) as well as total expenditure, the amounts spent for each expenditure group and food item including the quantities consumed. For the regression analysis, individual data were preferable to group averages because certain food commodities were consumed by only a fraction of all households. Therefore, computations based on arithmetic group averages in some cases would have yielded biased elasticities.

The purpose of the econometric evaluation was to furnish estimates of expenditure elasticities (and, for food items also of quantity elasticities) in relation to total expenditure and household size for 21 expenditure groups and 64 food commodities. The following double-logarithmic equation was selected as the consumption function:

$$\log Y_i = A_i + B_i \log X + C_i \log Z + U_i \quad (15)$$

Here, Y_i denotes expenditure on the i-th item, X total expenditure per consumer unit per year, and Z household size in terms of consumer units. The number of households included varied from commodity to commodity, since all households showing no expenditure on a particular item have been excluded. 59/ This procedure seemed to be the best way to avoid the problem of taking the logarithm of zero. 60/

The parameters A_i, B_i and C_i were estimated by the classical method of least squares. The term U_i denotes the random element of the function with zero mean and constant finite variance.

57/ Details on the collection and evaluation of the survey data are given in the preceding chapter.

58/ Cross-classification of group data by level of expenditure and household size.

59/ Out of the total of 85 expenditure groups and food commodity categories (i = 1, 2, ... 65, 65a, 65b, ... 85) one item (horse meat) was consumed by only 10 out of 462 households; 15 further commodities were consumed by from 100 to 300 households, and 21 items were consumed by from 300 to 400 households. The majority of expenditure groups (48 in number) appeared in more than 400 of the individual household records.

60/ S.J. Prais and H.S. Houthakker, The Analysis of Family Budgets, Cambridge, 1955, p. 50.

Table 115. – Proportion of food expenditure and parameter estimates of partial expenditure elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959

Commodity	Proportion spent 1/	Number of households	Partial expenditure elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
	Percent	N	B	s_B	C	s_C	t_B	t_C
Total food expenditure	100.0	462	0.364	0.023	-0.017	0.024	15.772***	-0.711
of which: home-produced food	65.24	462	0.175	0.045	-0.076	0.047	3.837***	-1.621
purchased food	34.76	462	0.720	0.057	0.058	0.059	12.664***	0.978
Cereal products								
White bread	2.26	460	0.393	0.117	-0.048	0.122	3.346***	-0.395
Brown bread	6.67	462	0.130	0.073	-0.027	0.076	1.782	-0.357
Other bread	0.08	173	0.386	0.314	0.176	0.303	1.230	0.580
Cakes, pastries, etc.	0.36	352	1.415	0.202	-0.033	0.165	6.997***	-0.203
Wheat flour	3.35	459	0.143	0.091	-0.045	0.094	1.573	-0.479
Other flour	0.42	289	-0.212	0.300	-0.317	0.312	-0.708	-1.017
Macaroni, noodles, etc.	0.38	343	0.485	0.205	0.340	0.217	2.370*	1.564
Rice	0.51	455	0.327	0.112	0.181	0.116	2.916**	1.562
Maize products	0.30	220	-0.604	0.302	-0.229	0.308	-2.000*	-0.742
Semolina	0.29	443	0.450	0.128	-0.106	0.131	3.530***	-0.814
Other cereals	0.41	406	0.849	0.200	-0.178	0.206	4.256***	-0.863
Meat and fish								
Beef	1.36	373	0.646	0.193	-0.081	0.204	3.354***	-0.397
Pork	11.96	457	0.553	0.133	-0.050	0.138	4.147***	-0.359
Mutton and goat meat	0.38	138	0.380	0.322	0.288	0.281	1.182	1.024
Veal	0.25	155	0.800	0.357	0.183	0.362	2.242*	0.507
Horse meat	0.01	10	0.372	1.074	-0.966	1.334	0.346	-0.725
Ham	5.81	393	-0.010	0.202	-0.398	0.211	-0.049	-1.888
Bacon	2.01	384	-0.282	0.192	-0.201	0.196	-1.466	-1.027
Sausages	2.97	457	0.923	0.135	-0.135	0.140	6.821***	-0.965
Canned meat	0.93	186	0.713	0.369	-0.083	0.387	1.932	-0.215

Table 115. - Proportion of food expenditure and parameter estimates of partial expenditure elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 - Continued

Commodity	Proportion spent 1/	Number of households	Partial expenditure elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
	Percent	N	B	s_B	C	s_C	t_B	t_C
Meat and fish (continued)								
Poultry	1.42	369	0.208	0.187	-0.235	0.203	1.111	-1.154
Ground meat	0.19	174	0.168	0.268	-0.271	0.297	0.628	-0.913
Offals	0.89	438	0.261	0.107	0.049	0.110	2.443*	0.441
Bones, other meat	0.43	398	0.188	0.158	0.065	0.166	1.189	0.392
Game	0.23	155	0.166	0.290	-0.694	0.306	0.572	-2.265*
Fresh fish, shell animals	0.16	267	0.575	0.165	-0.007	0.181	3.493***	-0.038
Canned fish	0.17	302	0.621	0.195	-0.071	0.206	3.185	-0.345
Fats and oils (excl.butter)								
Lard	2.67	450	0.306	0.156	-0.108	0.160	1.970*	-0.674
Back fat	0.44	211	-0.144	0.238	-0.644	0.256	-0.604	-2.511*
Margarine	0.63	383	0.395	0.204	-0.120	0.215	1.932	-0.558
Vegetable fats	0.11	203	0.331	0.314	0.224	0.312	1.056	0.720
Edible oils	0.83	439	0.473	0.154	0.242	0.159	3.063**	1.526
Dairy products and eggs								
Whole milk, fresh	10.91	462	0.150	0.072	-0.165	0.075	2.082*	-2.213*
Skim milk	0.40	190	-0.920	0.369	0.582	0.372	-2.495*	1.565
Other milk	0.08	159	-0.210	0.369	0.005	0.348	-0.570	0.015
Cream	0.56	302	-0.504	0.280	-0.145	0.288	-1.800	-0.502
Cheese	1.37	447	1.130	0.143	0.284	0.148	7.895***	1.919
Cottage cheese	0.23	334	-0.196	0.207	0.039	0.203	-0.947	0.190
Butter	6.17	461	0.798	0.155	0.427	0.161	5.154***	2.643**
Eggs	4.21	462	0.258	0.054	-0.052	0.056	4.770***	-0.925
Vegetables and fruit								
Fresh and frozen vegetables	1.38	462	0.469	0.092	-0.150	0.095	5.091***	-1.572
Potatoes	1.02	461	0.091	0.085	-0.034	0.077	1.076	-0.385

Table 115. – Proportion of food expenditure and parameter estimates of partial expenditure elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 – Continued

Commodity	Proportion spent 1/	Number of households	Partial expenditure elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
	Percent	N	B	s_B	C	s_C	t_B	t_C
Vegetables and fruit (continued)								
Pulses	0.20	344	0.374	0.207	0.449	0.208	1.804	2.158*
Southern fruit	0.55	452	1.030	0.147	0.134	0.152	7.002***	0.877
Other fresh fruit	2.50	462	0.470	0.083	0.067	0.086	5.654***	0.773
Canned fruit and vegetables	0.73	436	0.405	0.170	0.262	0.174	2.380*	1.502
Nuts, poppy, etc.	0.41	428	0.485	0.150	-0.184	0.153	3.241**	-1.203
Sugar and related products								
Sugar	4.05	462	0.273	0.048	0.054	0.050	5.686***	1.094
Syrup, honey substitute, etc.	0.07	194	0.692	0.263	0.194	0.288	2.632*	0.675
Jam, marmalade	0.59	389	0.275	0.167	0.383	0.174	1.644	2.198*
Bee honey	0.64	384	0.450	0.180	-0.131	0.186	2.498*	-0.703
Candies	0.40	443	0.799	0.166	-0.083	0.172	4.803***	-0.484
Coffee, tea, and cocoa								
Bean coffee	0.46	372	0.967	0.190	0.386	0.197	5.078***	1.961
Coffee substitutes	0.82	461	0.230	0.097	-0.043	0.101	2.372*	-0.429
Tea and substitutes	0.15	413	0.203	0.150	-0.092	0.153	1.352	-0.603
Cocoa	0.31	447	0.460	0.142	0.069	0.146	3.242**	0.473
Chocolate	0.54	448	1.166	0.154	0.100	0.159	7.557***	0.630
Beverages								
Non-alcoholic beverages	0.39	355	0.547	0.228	-0.069	0.240	2.396*	-0.288
Wine	1.74	397	0.929	0.218	0.271	0.226	4.262***	1.198
Beer	0.80	384	0.615	0.217	-0.558	0.226	2.830**	-2.471*
Liquers, brandies, etc.	1.30	448	0.305	0.160	0.120	0.166	1.906	0.724
Cider	2.61	386	0.361	0.195	-0.181	0.209	1.852	-0.865

Table 115. – Proportion of food expenditure and parameter estimates of partial expenditure elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 – Continued

Commodity	Proportion spent 1/	Number of households	Partial expenditure elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
	Percent	N	B	s_B	C	s_C	t_B	t_C
Other								
Other food, ingredients	1.86	462	0.431	0.059	0.043	0.061	7.273***	0.693
Meals outside the home	3.67	453	1.342	0.153	0.560	0.158	8.763***	3.537***

1/ Arithmetic mean of all 462 households.

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.

Table 116. – Quantity of food consumption per consumer unit per year and parameter estimates of partial quantity elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959

Commodity	Consumption per consumer unit per year in kilograms 1/	Number of households	Partial quantity elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
		N	B'	$s_{B'}$	C'	$s_{C'}$	$t_{B'}$	$t_{C'}$
Cereal products								
White bread	16.64	460	0.280	0.133	-0.012	0.137	2.112*	-0.090
Brown bread	92.19	462	0.098	0.081	0.011	0.084	1.211	0.133
Other bread	0.40	173	0.173	0.365	0.241	0.352	0.474	0.686
Cakes, pastries, etc.	0.70	352	1.390	0.224	-0.091	0.226	6.203***	-0.405
Wheat flour	42.67	459	0.111	0.092	-0.107	0.095	1.210	-1.126
Other flour	6.39	289	-0.343	0.356	-0.403	0.370	-0.964	-1.088
Macaroni, noodles, etc.	1.69	343	0.534	0.213	0.411	0.226	2.511*	1.819
Rice	3.65	455	0.285	0.114	0.172	0.118	2.493*	1.455
Maize products	4.40	220	-0.677	0.316	-0.263	0.323	-2.144*	-0.816
Semolina	2.87	443	0.429	0.130	-0.108	0.133	3.306**	-0.810
Other cereals	1.01	406	0.819	0.211	-0.070	0.218	3.877***	-0.318
Meat and fish								
Beef	2.68	373	0.637	0.197	-0.128	0.209	3.236**	-0.615
Pork	29.24	457	0.551	0.137	-0.045	0.141	4.039***	-0.316
Mutton and goat meat	1.59	138	0.295	0.341	0.326	0.298	0.865	1.093
Veal	0.48	155	0.674	0.393	0.192	0.398	1.716	0.482
Horse meat	0.02	10	0.391	1.023	-1.191	1.271	0.383	-0.937
Ham	13.26	393	-0.004	0.203	-0.388	0.212	-0.017	-1.829
Bacon	6.54	384	-0.294	0.198	-0.198	0.202	-1.482	-0.984
Sausages	6.90	457	0.894	0.143	-0.102	0.148	6.236***	-0.688
Canned meat	2.28	186	0.806	0.390	-0.067	0.409	2.064*	-0.165
Poultry	4.13	369	0.196	0.190	-0.231	0.206	1.034	-1.123
Ground meat	0.44	174	0.206	0.283	-0.240	0.314	0.729	-0.764
Offals	3.82	438	0.167	0.117	0.037	0.120	1.430	0.312

Table 116. - Quantity of food consumption per consumer unit per year and parameter estimates of partial quantity elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 - Continued

Commodity	Consumption per consumer unit per year in kilograms 1/	Number of households	Partial quantity elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
		N	B'	$s_{B'}$	C'	$s_{C'}$	$t_{B'}$	$t_{C'}$
Meat and fish (continued)								
Bones, other meat	4.35	398	0.210	0.156	0.076	0.164	1.342	0.463
Game	0.89	155	0.117	0.294	-0.543	0.311	0.396	-1.748
Fresh fish, shell animals	0.41	267	0.536	0.172	0.054	0.189	3.124**	0.287
Canned fish	0.29	302	0.474	0.205	-0.185	0.216	2.311*	-0.857
Fats and oils(excl. butter)								
Lard	9.60	450	0.283	0.157	-0.132	0.162	1.798	-0.814
Back fat	1.78	211	-0.132	0.235	-0.618	0.253	-0.561	-2.445*
Margarine	1.98	383	0.431	0.204	-0.094	0.215	2.114*	-0.436
Vegetable fats	0.34	203	0.297	0.319	0.171	0.317	0.932	0.540
Edible oils (liters)	2.50	439	0.499	0.154	0.197	0.158	3.234**	1.244
Dairy products and eggs								
Whole milk, fresh (liters)	269.24	462	0.131	0.071	-0.173	0.074	1.831	-2.335*
Skim milk (liters)	35.29	190	-0.897	0.370	0.580	0.373	-2.425	1.553
Other milk (liters)	4.27	159	-0.488	0.430	0.208	0.406	-1.133	0.512
Cream (liters)	3.57	302	-0.660	0.296	-0.215	0.304	-2.231*	-0.708
Cheese	3.50	447	1.196	0.150	0.320	0.155	7.997***	2.071*
Cottage cheese	1.96	334	-0.225	0.210	0.001	0.207	-1.069	0.003
Butter	10.41	461	0.755	0.168	0.416	0.175	4.495***	2.376*
Eggs (number)	232.65	462	0.263	0.056	-0.049	0.058	4.721***	-0.848
Vegetables and fruit								
Fresh and frozen vegetables	43.16	462	0.375	0.096	-0.170	0.099	3.922***	-1.711
Potatoes	82.67	461	0.051	0.082	-0.026	0.084	0.623	-0.309

Table 116. – Quantity of food consumption per consumer unit per year and parameter estimates of partial quantity elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 – Continued

Commodity	Consumption per consumer unit per year in kilograms 1/	Number of households	Partial quantity elasticities in relation to --					
			Total expenditure	Standard error	Household size	Standard error	Student's t-Test	
		N	B'	$s_{B'}$	C'	$s_{C'}$	$t_{B'}$	$t_{C'}$
Vegetables and fruit (continued)								
Pulses	2.22	344	0.221	0.225	0.423	0.225	0.984	1.874
Southern fruit	3.04	452	1.153	0.159	0.198	0.164	7.272***	1.204
Other fresh fruit	72.03	462	0.324	0.091	-0.066	0.094	3.580***	-0.700
Canned fruit and vegetables	8.19	436	0.121	0.237	0.295	0.243	0.510	1.214
Nuts, poppy, etc.	1.43	428	0.223	0.196	-0.407	0.200	1.142	-2.039*
Sugar and related products								
Sugar	29.93	462	0.286	0.049	0.060	0.051	5.805***	1.180
Syrup, honey substitute, etc.	0.18	194	0.380	0.263	0.014	0.288	1.444	0.049
Bee honey	1.08	384	0.423	0.179	-0.111	0.185	2.363*	-0.601
Jam, marmalade	3.12	389	0.294	0.176	0.367	0.184	1.669	2.001*
Candies	0.73	443	0.742	0.168	-0.100	0.174	4.417***	-0.574
Coffee, tea, and cocoa								
Bean coffee	0.24	372	0.857	0.185	0.313	0.192	4.624***	1.633
Coffee substitutes	2.71	461	0.180	0.097	0.006	0.101	1.856	0.058
Tea and substitutes	0.07	412	0.149	0.147	-0.122	0.149	1.014	-0.820
Cocoa	0.31	447	0.422	0.141	0.068	0.146	2.983**	0.468
Chocolate	0.55	448	1.168	0.155	0.064	0.160	7.529***	0.404
Beverages								
Non-alcoholic beverages (liters)	6.36	355	0.662	0.290	-0.088	0.305	2.282*	-0.287
Wine (liters)	9.47	397	0.791	0.262	0.212	0.272	3.022**	0.782
Beer (liters)	6.50	384	0.682	0.225	-0.553	0.234	3.030**	-2.361*

Table 116. – Quantity of food consumption per consumer unit per year and parameter estimates of partial quantity elasticities of demand in relation to total expenditure and household size, by food commodities, Austrian Farm Consumption Survey of 1959 – Continued

Commodity	Consumption per consumer unit per year in kilograms 1/	Number of households	Partial quantity elasticities in relation to --				Student's t-Test	
			Total expenditure	Standard error	Household size	Standard error		
		N	B'	$s_{B'}$	C'	$s_{C'}$	$t_{B'}$	$t_{C'}$
Beverages (continued)								
Liqueurs, brandies, etc. (liters)	2.83	448	0.239	0.160	0.135	0.166	1.494	0.815
Cider (liters)	130.70	386	0.273	0.224	-0.179	0.240	1.218	-0.746

1/ Arithmetic mean of all 462 households.

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.

Table 117. – Proportion of consumer expenditure and parameter estimates of partial expenditure elasticities of demand in relation to total expenditure and household size, by major consumer items, *Austrian Farm Consumption Survey of 1959*

Major consumer items	Proportion spent 1/ Percent	Partial expenditure elasticities in relation to --					
		Total expenditure B	Standard error s_B	Household size C	Standard error s_C	Student's t-Test t_B	t_C
Food	44.03	0.364	0.023	-0.017	0.024	15.772***	-0.711
Tobacco products	0.83	0.377	0.326	0.178	0.332	1.159	0.537
Rent	3.84	0.822	0.068	-0.413	0.070	12.150***	-5.882***
Upkeep and cleaning of flat	2.67	2.310	0.204	0.429	0.212	11.306***	2.023*
Furniture	4.14	2.297	0.264	-0.157	0.278	8.688***	-0.566
Household equipment	2.39	2.105	0.191	0.180	0.194	11.035***	0.926
Lighting, heating	5.98	0.689	0.058	-0.615	0.060	11.853***	-10.207***
Clothing, underwear	9.37	1.324	0.074	0.288	0.077	17.813***	3.736***
Shoes	2.89	1.123	0.093	0.311	0.096	12.117***	3.234**
Household garments	1.06	1.192	0.207	0.252	0.213	5.755***	1.182
Cleaning of clothing, etc.	1.13	1.128	0.086	-0.030	0.089	13.111***	-0.337
Medical care	3.55	1.726	0.171	0.079	0.177	10.101***	0.444
Body care	0.75	1.679	0.121	-0.018	0.126	13.844***	-0.144
Education	2.30	1.472	0.144	0.543	0.150	10.202***	3.619***
Recreation, entertainment	1.91	1.845	0.136	-0.069	0.141	13.518***	-0.488
Own traffic facilities	4.34	2.869	0.289	0.049	0.306	9.928***	0.159
Other traffic facilities	0.97	0.544	0.148	0.277	0.152	3.673***	1.824
Gifts, donations	2.29	2.187	0.157	0.059	0.163	13.930***	0.361
Membership fees	0.88	1.090	0.136	-0.389	0.142	8.011***	-2.738**
Domestic services	0.99	2.067	0.430	0.330	0.442	4.808***	0.746
Other expenditure	3.69	2.095	0.185	0.266	0.192	11.309***	1.383

1/ Arithmetic mean of all 462 households.

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.

The multiple regression coefficients B_i and C_i are the partial expenditure elasticities in relation to total expenditure and household size.

According to the equation

$$\log Q_i = A'_i + B'_i \log X + C'_i \log Z + U'_i \quad (16)$$

also quantity elasticities of demand in relation to total expenditure (B'_i) and household size (C'_i) were computed for 63 food commodities. Here Q_i denotes the quantity of the item i consumed per consumer unit.

Unbiased elasticities in relation to total expenditure (B for expenditure, B' for quantities) for the total number of households can only be computed if the elasticities for the individual household sizes(B_j, B'_j) do not differ significantly from each other. In this case the "true" elasticity for all household sizes is equal to the average of the individual coefficients B'_j and B'_j, weighted by their respective variances. The graphical evaluation which was carried out for several expenditure groups on the basis of cross-classified group averages indicated that this condition is approximately met: the respective Engel curves of the various household sizes showed varying distances from the X-axis (different "consumption levels") but suggested a common slope.

The results of the regression analysis are summarized in the three tables: 115, 116, and 117. The reliability of the elasticities is indicated by their standard errors and by the significance of the coefficients at the .05, .01, and .001 significance levels. In most cases, the multiple correlation coefficient R^2 is rather small; of the order of 0.2 - 0.4 for expenditure groups and generally below 0.1 for food commodities. The analysis based on the grouped data yielded a much higher value for R^2. In this case, however, the accuracy of the adjustment is overestimated because these correlation coefficients measure only the residual variance between groups without taking into account the variances within the groups. This is valid to a still greater extent for the correlation coefficient of Engel curves derived from the urban consumption survey.

The regression analysis shows a strong correlation between the amounts spent on the individual expenditure groups and the level of total expenditure. In general, the elasticities obtained are highly significant. A single exception is expenditure on tobacco products, but this may be due to inaccuracies in the household reports. A significant influence of household size was observed only for a few expenditure groups (housing, clothing, education, membership fees). Within the expenditure group "total food", only expenditure for meals and beverages taken outside the home were found to be significantly influenced by household size. The absence of significant effects of household size on food consumption in farm households cannot be explained by the fact that the data had been related to consumer units. The estimated values of the parameters for total food expenditure on the basis of grouped data which are cross-classified by total expenditure and household size remain almost unchanged if consumption expenditure and household size refer to physical persons instead of consumer units.

These interrelationships can be appraised more clearly if total food expenditure of farm households is evaluated separately for home-produced and purchased food commodities. While the elasticity of total food expenditure in relation to household size is slightly negative and statistically not significant ($C = -0.017$), the estimated values for home-produced food commodities are significantly negative (C = -0.076), and for purchased food commodities significantly positive (C = +0.058). The differences are probably related to the fact that the elasticity in relation to total expenditure for home-produced food commodities (B = 0.175) is much lower than for total food consumption (B = 0.364), and this in turn is again much lower than for purchased food commodities (B = 0.720). While in the case of home-produced food the "specific" economies of scale were larger than the only moderate income effect, although both effects about balanced each other in the case of total food expenditure. For purchased commodities, which are almost luxury goods for the farm population, the income effect is greater. Consumption of these goods is not only rising when per capita income increases but also when economies in home-produced foods are made possible by increasing household size. The elasticity in relation to household size for home-produced food commodities in farm households (C = -0.076) is notably almost equal to the elasticity for total food expenditure in urban households (C = -0.079).

As already mentioned, the regression analysis was based on double-logarithmic consumption functions. To get an idea as to what extent the average elasticity coefficient in relation to total expenditure depends on the type of the consumption function (shape of the curve), two additional algebraic forms were employed. They were:

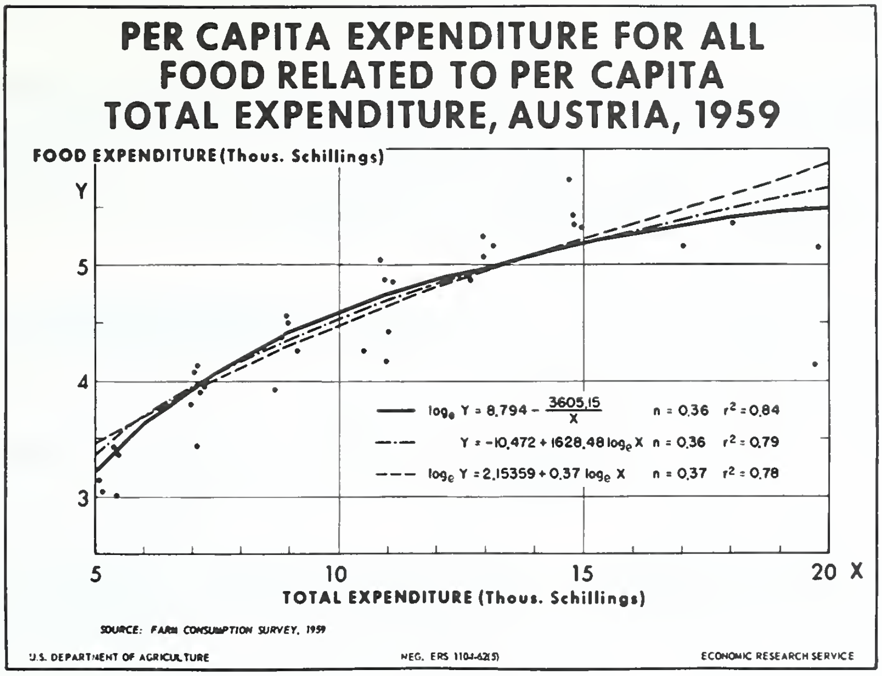
$Y = A + B \log_e X + U$ (the semi-logarithmic form) (17)

$\log_e Y = A - B/X + U$ (logarithmic-inverse form) (18)

and were fitted on the basis of the cross-classified group averages. Here, the small influence of household size was neglected.

The calculated average elasticity coefficients, $\eta = \frac{B}{Y}$ for equation (17) and $\eta = \frac{B}{X}$ for equation (18) show no considerable deviations as compared to the elasticity coefficients obtained by double-logarithmic adjustment ($\eta = B$). The correlation coefficients are somewhat higher since the semi-log and log-inverse functions take better account of the lowest and highest income ranges (fig. 32). It is questionable, however, whether the latter consumption functions give a better representation than the double-logarithmic consumption function of the relation of consumption upon total expenditure in the expenditure ranges covered, because the number of observations in the upper income ranges is small, and the data are probably to a higher degree subject to errors of observation.

The results of these calculations are of considerable practical relevance for the projections in section 3 of this chapter. Since the various consumption functions yielded approximately the same average elasticity coefficients in the respective range of total expenditure, the constant elasticities derived from double-log functions can be applied to other types of consumption functions (e. g., the semi-log or log-inverse function) with a minimum of error. This makes it possible to work out projections under alternative assumptions with respect to the nature of the elasticity coefficient (constant, dependent on the level of consumption or of total expenditure). This is important because the results of the projections depend considerably on the type of curve selected especially in the case of income-elastic goods. If for instance, per capita expenditure of the farm population increases 71 percent by 1975, the increase of expenditure for citrus fruit (assuming the same average elasticity) is estimated at 84 percent on the basis of the double-log function, but only at 51 percent and 55 percent respectively on the basis of the semi-log and log-inverse functions.



PER CAPITA EXPENDITURE FOR ALL FOOD RELATED TO PER CAPITA TOTAL EXPENDITURE, AUSTRIA, 1959

SOURCE: FARM CONSUMPTION SURVEY, 1959

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1104-62(5) ECONOMIC RESEARCH SERVICE

Figure 32

1.3 Time Series Analysis

The present analysis is also based on time series of consumption and prices of individual food commodities, disposable personal income, and total consumption expenditure for the period 1934-38 and from 1947-48 to 1959-60. 61/

From preliminary graphical analysis, 62/ a linear-in-the-logarithmic demand function was selected; that is:

61/ The statistical sources have been described in Chapter VII.

62/ Although the preliminary scatter diagrams are not presented in the text, the results of the graphical analysis can be summarized as follows: (1) A marked "kink" was shown in the relation between per capita food consumption and per capita income which approximately coincides with the end of food rationing (between 1949-50 and 1952-53). (2) Apparently consuming habits have changed so much that prewar data cannot be used as the basis for present and future evaluation of food consumption. (3) Approximately a linear-in-the-logs relation has existed for the past 7 to 10 years between per capita consumption of most food items and per capita income. (4) The correlation between consumption and the level of total expenditure is in most cases closer than that between consumption and income, and a very loose relationship or no correlation at all was observed between income and the consumption of pulses, cereals, fish, and vegetables due mainly to inadequate consumption data. (5) The correlation of larger aggregates with the determining variable was generally closer than that of individual items where relative prices and changes in consumption habits are important. This is particularly evident in the case of fats where the consumption of margarine, vegetable fats, and other edible oils seems to be practically independent of income changes, whereas total fat consumption is closely correlated with income.

$$\log Q = k_0 + \sum_{i=1}^{p} k_i \ \log X_i + K_t T$$

Here Q denotes per capita consumption in quantities of the respective commodity; X_i ($i = 1, \ldots, p$) denote the determining variables which can be measured directly, and T is a trend factor which represents the sum of all time-dependent demand factors not covered by the variables X_1 to K_p. The random element of the function with zero mean and constant finite variance is denoted by U. The constants k_0, $k_1, \ldots k_p$, k_T are the parameters of the function to be estimated.

The determining variables X_1, $X_2, \ldots X_p$ include per capita disposable personal income, total per capita consumption expenditure, and the price of the commodity as well as that of competing commodities. 63/

63/ This can be proven by the following considerations. Consider the contents of the equation:

$$Y = K_0 + k_1 X_1 + k_2 X_2 \qquad \text{(a)}$$

are to be estimated by least squares. There exists, however, the following exact linear relationship between the independent variables X_1 and X_2:

$$X_1 = M_0 + M_2 X_2 \qquad \text{(b)}$$

In order to estimate the regression constants k_1 and k_2, we have to solve the following normal equations:

$$\begin{array}{c} k_1 \Sigma X_1^2 + k_2 \Sigma X_1 X_2 = \Sigma X_1 Y \\ \hline k_1 \Sigma X_1 X_2 + k_2 \Sigma X_2^2 = \Sigma X_2 Y \end{array} \qquad \text{(c)}$$

Where $\overset{n}{\Sigma}\ x$ denote the sums of the squares and the cross-products (expressed in the deviations from the respective means) of the variables X_1, X_2 and Y. However, because of equation b, the following relation holds:

$$\Sigma X_1^2 = M_2^2 \ \Sigma X_2^2 \text{ and } \Sigma X_1 X_2 = M_2 \ \Sigma X_2^2 \qquad \text{(d)}$$

This means that the matrix of the system of equations (c) becomes

$$\begin{bmatrix} M_2^2 \ \Sigma X_2^2 & M_2 \Sigma X_2^2 \\ M_2 \ \Sigma X_2^2 & \Sigma X_2^2 \end{bmatrix} = 0 \qquad \text{(e)}$$

whose determinant will be zero.

Hence, the non-homogeneous system (c) cannot technically be solved. However, since the data of time series are subject to errors of observations, the relation (b) between independent variables is not exactly linear. This means that in actual practice the determinant of (e) is not equal to zero, but assumes instead a small value which depends on the deviation from the relationship. Thus, the normal equations can be solved, but the values of the computed regression coefficients depend only on the errors of observation, and in many instances they do not permit an economically meaningful interpretation.

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Total food						
(a) at current prices deflated by food price index (1950-51-1959-60)						
$\log Y=k_0+k_1 \log X_1+U$	8	0.588*** (0.048)				0.949
$\log Y=k_0+k_2 \log X_2+U$	8		0.626*** (0.053)			0.945
(b) quantities at constant prices of average 1952-53--1956-57 (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.502*** (0.059)				0.912
$\log Q=k_0+k_2 \log X_2+U$	7		0.505*** (0.080)			0.851
All meat (1952-53—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	5	0.479*** (0.044)				0.959
$\log Q=k_0+k_2 \log X_2+U$	5		0.632*** (0.047)			0.973
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	4	0.487** (0.079)		-0.046 (0.355		0.959
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	4		0.660** (0.083)	-0.126 (0.287)		0.974
Beef (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.444*** (0.045)				0.932
$\log Q=k_0+k_2 \log X_2+U$	7		0.466*** (0.041)			0.949
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	0.474** (0.081)		-0.067 (0.144)		0.934

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria - Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		0.582*** (0.062)	-0.235 (0.107)		0.972
Pork (1952-53—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	5	0.624*** (0.040)				0.980
$\log Q=k_0+k_2 \log X_2+U$	5		0.817*** (0.053)			0.980
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	4	0.626*** (0.045)		0.089 (0.345)		0.980
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	4		0.815*** (0.059)	-0.069 (0.348)		0.980
Veal (1952-53—1958-59)						
$\log Q=k_0+0.575 \log X_2+k_3+U$ (conditional regression; $k_2=0.575$, derived from the Urban Consumption Survey)				-1.573 (0.369)		0.548
Poultry (1952-53—1958-59) X_4: deflated price of veal						
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	4	1.477 (0.664)		-4.994 (2.558)		0.947
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	4		1.862 (0.908	-5.178 (2.671)		0.942
$\log Q=k_0+k_1 \log X_1+k_3+k_4 \log X_4+U$	3	1.363 (0.681)		-0.564 (5.263)	2.290 (2.371)	0.960

Table 118. – Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria – Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Poultry (continued)						
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + k_4 \log X_4 + U$	3		1.677 (0.986)	-1.370 (5.655)	2.038 (2.624)	0.952
Eggs (1950-51—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	7	1.628*** (0.189)				0.914
$\log Q = k_0 + k_2 \log X_2 + U$	7		1.733*** (0.142)			0.955
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	6	1.295** (0.340)		-0.826 (0.709)		0.930
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + U$	6		1.579** (0.299)	-0.356 (0.599)		0.957
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + k_t T_1 + U$	5		0.892 (1.110)	-0.078 (0.764)	0.0211 (=+5% per year)	0.961
Fluid milk (1950-51—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	7	0.172* (0.063)				0.511
$\log Q = k_0 + k_2 \log X_2 + U$	7		0.191* (0.060)			0.594
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	6	0.130 (0.059)		0.362 (0.197)		0.686
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + U$	6		0.145 (0.071)	0.264 (0.227)		0.669
Cheese (1950-51—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	7	1.272*** (0.157)				0.903
$\log Q = k_0 + k_2 \log X_2 + U$	7		1.363*** (0.110)			0.956

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria - Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Cheese (continued)						
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	1.092*		-0.606		0.906
		(0.445)		(1.389)		
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		1.191**	-0.579		0.960
			(0.253)	(0.757)		
Cream (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	2.029***				0.967
		(0.163)				
$\log Q=k_0+k_2 \log X_2+U$	7		2.001***			0.858
			(0.307)			
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	2.018***		-0.152		0.957
		(0.180)		(0.590)		
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		1.968***	-1.156		0.887
			(0.298)	(0.937)		
Fats and oils, pure content (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.316***				0.881
		(0.044)				
$\log Q=k_0+k_2 \log X_2+U$	7		0.300**			0.730
			(0.069)			
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	0.266**		0.202		0.911
		(0.054)		(0.144)		
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		0.225	-0.374		0.860
			(0.062)	(0.158)		
Edible oils (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	1.361**				0.795
		(0.261)				
$\log Q=k_0+k_2 \log X_2+U$	7		1.253*			0.622
			(0.370)			

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria - Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Edible oils (continued)						
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	1.357** (0.292)		-0.030 (0.521)		0.792
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		1.257* (0.421)	0.019 (0.721)		0.622
Lard, tallow, pure content (1951-52—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	6	0.527*** (0.057)				0.934
$\log Q=k_0+k_2 \log X_2+U$	6		-0.617*** (0.067)			0.935
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	5	-0.233** (0.042)		0.570*** (0.075)		0.995
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	5		0.274** (0.049)	0.568*** (0.074)		0.995
Lard (1951-52—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	6	0.870*** (0.132)				0.879
$\log Q=k_0+k_2 \log X_2+U$	6		1.017*** (0.155)			0.877
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	5	0.651* (0.229)		1.143 (0.985)		0.905
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	5		-0.757* (0.269)	1.156 (0.991)		0.903
Sugar (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.849*** (0.079)				0.943
$\log Q=k_0+k_2 \log X_2+U$	7		0.843*** (0.130)			0.858

Table 118. – Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria – Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Sugar (continued)						
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	6	0.220 (0.217)		-1.316 (0.440)		0.977
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + U$	6		0.153 (0.333)	-1.477** (0.258)		0.978
$\log Q = k_0 + 0.135 \log X_2 + k_3 \log X_3 + U$				-1.509 (0.239)		0.971
(conditional regression; k_2+0.135, derived from the Urban Consumption Survey)						
Flour products (1951-52—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	6	0.011 (0.048)				0.009
$\log Q = k_0 + k_2 \log X_2 + U$	6		0.028 (0.055)			0.041
Cereals (1950-51—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	7	-0.021 (0.014)				0.242
$\log Q = k_0 + k_2 \log X_2 + U$	7		-0.017 (0.015)			0.144
Potatoes (1950-51—1958-59)						
$\log Q = k_0 + k_1 \log X_1 + U$	7	-0.232*** (0.026)				0.921
$\log Q = k_0 + k_2 \log X_2 + U$	7		-0.250*** (0.012)			0.985
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	6	-0.248*** (0.034)		0.052 (0.072)		0.927
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + U$	6		-0.259*** (0.014)	0.029 (0.029)		0.987

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria - Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Vegetables (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.150*** (0.018)				0.909
$\log Q=k_o+k_2 \log X_2+U$	7		0.146** (0.028)			0.794
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	0.191*** (0.024)		-0.094 (0.045)		0.947
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		0.189** (0.050)	-0.091 (0.089)		0.824
Fresh fruit (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	0.881 (0.657)				0.204
$\log Q=k_0+k_2 \log X_2+U$	7		0.778 (0.709)			0.147
$\log Q=k_0+k_1 \log X_1+k_3+U$	6	1.829** (0.368)		-1.839** (0.391)		0.844
$\log Q=k_0+k_2 \log X_2+k_3 \log X_3+U$	6		1.870** (0.463)	-1.995** (0.473)		0.785
$\log Q=k_0+0.606 \log X_2+k_3 \log X_3+U$ (conditional regression; $k_2=0.606$ derived from Urban Consumption Survey)				-1.274 (0.662)		0.436
Citrus fruit (1950-51—1958-59)						
$\log Q=k_0+k_1 \log X_1+U$	7	3.198*** (0.537)				0.835
$\log Q=k_0+k_2 \log X_2+U$	7		3.529*** (0.344)			0.938
$\log Q=k_0+k_1 \log X_1+k_3 \log X_3+U$	6	0.323 (1.602)		-1.773 (0.946)		0.896

Table 118. - Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria - Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Citrus fruit (continued)						
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + U$	6		3.462	0.039		0.938
			(1.713)	(0.971)		
$\log Q = k_0 + k_2 \log X_2 + k_3 \log X_3 + k_4 \log X_4 + U$	5		1.906	-0.660	0.890	0.973
			(1.383)	(0.744)	(0.350)	
$\log Q = k_0 + k_3 \log X_3 + k_4 \log X_4 + U$	6			-1.658***	1.103*	0.962
				(0.187)	(0.337)	
X_4: deflated price of fresh fruit						
Tobacco products						
Quantity at prices of 1951 (1950-1960)						
(a) Excluding black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.617***				0.852
		(0.086)				
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.511***		-0.405		0.909
		(0.086)		(0.182)		
(b) Including black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.466***				0.847
		(0.066)				
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.434***		-0.124		0.857
		(0.081)		(0.174)		
Cigarettes, quantity (1950-1960)						
(a) Excluding black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.683***				0.850
		(0.095)				

Table 118. – Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria – Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Cigarettes (continued)						
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.577*** (0.101)		-0.407 (0.214)		0.897
(b) Including black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.515*** (0.077)				0.833
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.492*** (0.097)		-0.090 (0.208)		0.836
Cigarettes, expenditure (1950-1960)						
(a) Excluding black market purchases						
$\log Y = k_0 + k_1 \log X_1 + U$	9	0.544*** (0.093)				0.841
$\log Y = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.522*** (0.089)		-0.471 (0.190)		0.910
(b) Including black market purchases						
$\log Y = k_0 + k_1 \log X_1 + U$	9	0.525*** (0.077)				0.839
$\log Y = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.463*** (0.089)		-0.240 (0.191)		0.865
Tobacco, quantity (1950-1960)						
(a) Excluding black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.454*** (0.077)				0.796
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.370** (0.082)		-0.320 (0.174)		0.857

Table 118. – Parameter estimates for quantity and expenditure elasticities of demand as derived from time series, with comparisons, Austria – Continued

Food commodities and demand functions	Degrees of freedom	Elasticity coefficients 1/				
		k_1	k_2	k_3	k_4	r^2, R^2
Tobacco (continued)						
(b) Including black market purchases						
$\log Q = k_0 + k_1 \log X_1 + U$	9	0.323***				0.768
		(0.059)				
$\log Q = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.303**		-0.078		0.775
		(0.074)		(0.159)		
Tobacco, expenditure (1950-1960)						
(a) Excluding black market purchases						
$\log Y = k_0 + k_1 \log X_1 + U$	9	0.573***				0.819
		(0.090)				
$\log Y = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.445***		-0.490**		0.911
		(0.081)		(0.171)		
(b) Excluding black market purchases						
$\log Y = k_0 + k_1 \log X_1 + U$	9	0.466***				0.821
		(0.073)				
$\log Y = k_0 + k_1 \log X_1 + k_3 \log X_3 + U$	8	0.392**		-0.285		0.867
		(0.080)		(0.170)		

1/ Elasticity coefficients derived from double logarithmic formula

$$a + \Sigma k_i \log X_i = \log Y; \log Q$$

Where: Y: Expenditure per capita (deflated); Q: Quantity per capita; X_1: Disposable personal income per capita (deflated); X_2: Total expenditure per capita (deflated); X_3: Own price (deflated); X_4: Price of a substitute (deflated); X_T: Time

* Significant at the probability level of 95 percent
** Significant at the probability level of 99 percent
*** Significant at the probability level of 99.9 percent

Note: Figures in parentheses indicate the standard errors of the coefficients.

These variables were used for the explanation of fluctuations in consumption individually (simple regression) as well as in various meaningful combinations (multiple regression). Thus, for most products 10 or more regression equations were fitted. In general, the regression analysis covered the period from 1950-51 to 1958-59. For some commodities, computations based on a varying number of observations suggested that for the final analysis one or two observations should be dropped because the data for the beginning fifties were inadequate due to food rationing.

An economically meaningful analysis of time series data was found difficult for various reasons. Due to the small number of observations, the possibilities of the evaluation were limited. In many instances it was not possible to obtain significant coefficients even with a small number of variables included. In general, therefore, no more than three independent variables were used in the regression equations. Furthermore, the successive elements of the various series generally were not independent from each other (autocorrelation). The least-squares method, however, still yields unbiased estimates even if the autocorrelation of the residuals does not equal zero. For exact computations it would be necessary, though, to adjust the standard error by a factor which depends on the coefficient of autocorrelation. Finally, there was frequently found a close correlation between the independent variables, e.g., between price and income (multicollinearity). Due to multicollinearity, it was not possible to separate the effects of the individual variables and to estimate structural parameters. The estimates derived from such regression equations are often economically meaningless.

The results of the analysis using time series are summarized in table 118. Regression equations which gave spurious results have not been included. In most cases the quantity elasticity of demand in relation to disposable personal income (or total consumption expenditure) could be estimated with sufficient statistical reliability. In most cases no significant influence of prices on the level of consumption was observed. This is partly due to the fact that real prices often have changed very little during the period investigated or they are closely correlated with income. For some commodities (such as poultry, citrus and other fruit, eggs and sugar) economically meaningful values were obtained but they are not statistically significant due to the small number of degrees of freedom. The demand for individual products in most cases showed a much higher price elasticity than the demand for commodity groups, which is in line with the general experience that possibilities of substitution are larger between commodities of a very similar character than between commodity groups with different consumption usages. In several cases, i.e., citrus fruit and poultry, the results of the evaluation could be improved by the compulation of cross-price elasticities. In general, no improvement in the estimated values could be obtained by inclusion of a "trend factor" in the regression equation, or by estimation of "difference equations", or by the method of conditional regression where the elasticities of the Urban Consumption Survey were assumed as given.

1.4 Quality elasticities of demand for important food commodities

In the econometric analysis of food consumption a distinction has been made so far between "quantity" elasticities and "expenditure" elasticities of the demand for individual food commodities in relation to total consumption expenditure. Quantity elasticities were used to measure the reaction of Austrian households to quantities consumed of a certain commodity (in kilograms or liter-units)to changes in total expenditure (income). Expenditure elasticities were used to reflect the changes in consumption expenditure (in terms of Austrian schillings at constant prices).

A third type of elasticity is the "quality" elasticity of demand. Quality elasticities are used to indicate the percentage rise of the average unit price of a certain commodity when income rises by 1 percent; they are derivable as the numerical difference between a commodity's expenditure elasticity and its quantity elasticity of demand. This can be shown by writing per capita expenditure on the i-th commodity (Y_i) in terms of its quantity (Q_i) and price (P_i) components before differentiating to obtain expenditure elasticity of demand in relation to total per capita consumption expenditure (X):

$$\frac{dY_i}{dX}\,\frac{X}{Y_i} = \left[Q_i \frac{dP_i}{dX} + P_i \frac{dQ_i}{dX}\right]\frac{X}{P_iQ_i} = \left(\frac{dP_i}{dX}\,\frac{X}{P_i}\right)+\left(\frac{dQ_i}{dX}\,\frac{X}{Q_i}\right)$$

where by definition:

$$Y_i = P_iQ_i$$

Hence, the expenditure elasticity of demand for the i-th commodity is the sum of the commodity's quantity elasticity and its quality elasticity, or the commodity's quality elasticity is equal to its expenditure elasticity minus its quantity elasticity. The higher average prices which are paid by households in the upper income brackets reflect partly the preference for better qualities and partly the shift to consumption of goods whose prices include a higher proportion of processing and market costs. The value of the quality elasticities derived in this study depended not only on the kind of product but also on the commodity nomenclature adopted in the consumption surveys and the food balance sheets. 64/

The extent of quality-elasticity is shown in table 119, where comparisons are made between the urban and the farm population. For most food commodities the quality elasticities are larger in urban households than in farm households. This is explained by the fact that in farm households the foodstuffs were mostly home-produced and hence were valued at imputed average prices. 65/ Possible differences in the quality of these commodities were therefore not statistically ascertained. Another reason for the small quality elasticities in agricultural households is that the qualitative demand for purchased foodstuffs (such as citrus fruit, sugar, chocolate, candies, pastries, etc.) increases less in agricultural households with rising incomes than in urban households. In many cases, the quality elasticity is even negative.

The highest quality elasticities (derived from the Urban Consumption Survey) were obtained for cream (estimated at 0.36), sugar products (0.29), canned meat (0.27),

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64/ Where the commodity list went into details and the commodities included under each heading were rather homogeneous, the quality elasticities were generally small. (In the case of completely homogeneous commodities the quality elasticities would approach zero.) If, on the other hand, the classification of commodities was more aggregative, the range of quality differences and of the stages of processing within each class were larger.

65/ On the average of all households, 65 percent of total food consumption represented home-produced food commodities, varying from 70 percent in the lowest expenditure bracket to 56 percent in the highest expenditure bracket.

Table 119. – Parameter estimates of quality elasticities of the demand for selected food commodities, with urban-rural comparisons, Austria 1/

Food commodity	Estimates derived from the			
	Urban Consumption Survey 1954-55 2/		Farm Consumption Survey 1959	
Bread grain products	0.06	(0.05)	0.07	
of which white bread	-0.00		0.11	
brown bread	0.00		0.03	
wheat flour	0.02	(-0.04)	0.03	
macaroni, etc.	0.10		-0.05	
Pastries	0.13		0.03	
Cereal preparations	0.27		0.64	
Meat and meat preparations	0.13	(0.14)	0.06	
of which beef	0.06	(0.03)	0.01	
pork	0.02	(0.02)	0.00	
veal	0.05		0.13	
poultry	0.15		0.01	
smoked meat and ham	0.11	(0.12)	-0.01	
sausages	0.20	(0.23)	0.03	
canned meat	0.27		-0.09	
Lard	0.05		0.02	
Margarine	0.01		-0.04	
Compound lard	0.10		0.03	
Cooking oils	0.07		-0.03	
Fresh whole milk	0.02	(0.01)	0.02	
Cream	0.36		0.16	3/ (0.15)
Cheese	0.06		-0.07	
Butter	0.02		0.04	
Eggs	0.03		-0.01	
Vegetables	0.17	(0.15)	0.09	
Fruit	-0.01	(-0.13)	0.15	
Southern fruit	0.03		-0.12	
Sugar	0.00		-0.01	
Marmalade and jam	-0.05		-0.02	
Sugar preparations	0.29		0.06	
Chocolate products	0.04		-0.00	

1/ Calculated as the difference between the expenditure and quantity elasticities in relation to total expenditure.

2/ The coefficients in parentheses were calculated from the expenditure and quantity elasticities adjusted for household size.

3/ Calculated on the basis of imputed expenditure and quantity elasticities.

cereals (0.27), and sausages. The latter commodity's quality elasticity was estimated at 0.20 on the basis of unadjusted elasticity and 0.23 on the basis of the elasticity adjusted for the effect of household size. Commodities showing high quality elasticities were all subject to wide variations in quality and prices; they did not satisfy basic needs and demand was shown earlier to be relatively more elastic. The high quality elasticity for cream is mainly explained by rising incomes. Consumers were buying more whipping cream (which was 130 percent more expensive than sour cream) or cream for coffee. In the case of cereals, it is probably significant that households with higher incomes spend relatively more for high-quality preparations for babies and for special dietary cereals.

Moderate quality elasticities of demand were exhibited in the case of poultry, vegetables, pastries, and smoked ham. The quality elasticity of the demand for most of the remaining commodities was below 0.10, or even negative (wheat flour, fruit, jam).

The attempt to derive quality elasticities from time series did not materialize. The time series were not suitable because expenditures have been estimated only very roughly.

1.5 Elasticity of demand for agricultural raw products

In this section the demand for food has been evaluated at the farm gate and comparisons made with the corresponding demand evaluated (a) at the consumer level in terms of the aggregate elasticity at the retail level and (b) at the marketing level in terms of the aggregate elasticity of the various processing and distributive services added to the agricultural raw products. When evaluated at the farm level, aggregate expenditure elasticity coefficient of demand for food indicates the percentage by which the revenues of agricultural producers from the sale of the agricultural raw food products will increase if total consumption expenditure rises by 1 percent. As such, this elasticity of demand for agricultural raw products determines how responsive the gross income of the agricultural sector is to changes in household purchasing power, and it aids in the assessment of sales possibilities of domestic agriculture.

The elasticity of demand for agricultural raw products could best be determined by the logarithmic differentiation of a regression function of agricultural receipts on total expenditure. Expenditure data in the consumption surveys was split up for each commodity and each expenditure allocated to the share received by the agricultural sector and the share received by the processing and distributive services sector. Such a detailed subdivision, however, was not carried out in the present study owing to the lack of detailed data. As an approximation, use was made of the quantity elasticities which were known for all principal products which are domestically produced, with the quantity-elasticity coefficients of the various products weighted according to their respective importance in the revenues of agricultural producers. [66]

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[66] The elasticity of demand for agricultural raw products contained in food was approximated by the formula:

$$\Sigma \left[P_i^F Q_i^F \Big/ \Sigma P_i^F Q_i^F \right] b_i^R$$

where b_i^R denotes the quantity elasticity in relation to total expenditure at retail for the i-th commodity, and P_i^F and Q_i^F denote respectively the price and quantity of agricultural

The results of the calculations are shown in table 120 where the quantities consumed of the various commodities (on the basis of the consumption surveys) were converted into agricultural raw products by means of empirical conversion factors (meat into livestock, flour into grain, dairy products into milk, sugar into sugarbeets, etc.) and valued at average producer prices. The calculations gave a demand elasticity coefficient of urban households for agricultural raw products of 0.36, the sales prospects for animal products being much more favorable than for crop products which is in line with expectations. The corresponding elasticity coefficients of demand at the retail level were estimated at (a) 0.52 for per capita food consumption of domestically produced commodities and (b) about 0.55 for total per capita food consumption which included a number of imported highly income-elastic products such as coffee, cocoa, and citrus fruit). Computations carried out for farm households showed practically no difference between the aggregate elasticity for food evaluated at the producer and at the consumer levels. This is mainly due to the fact that farm households consume mostly home-made foodstuffs, and that the quality elasticities for purchased food commodities are in most cases very small.

The expenditure elasticity of demand at the retail level can be shown to be the weighted average of the elasticity of demand at the farm level and the elasticity of demand for food processing and distributive services. Making use of this fact and the 62 percent share of the value of agricultural raw products in total consumption expenditure on food commodities in 1954-55, the urban population shows an elasticity coefficient of about 0.78 for the various services (food processing, and packaging as well as distribution) added to the agricultural raw products. This is considerably higher than the food demand elasticity evaluated at the retail level (0.52), and more than twice the food demand elasticity evaluated at the farm gate (0.36).

Similar results are obtained if the elasticities at producer and consumer levels derived from time-series (food balance sheets) are compared. The aggregate elasticity at the retail level (expenditure elasticity of total demand for food in relation to disposable personal income) was estimated at 0.59; it was estimated as 0.55 for domestically produced products. This value is probably somewhat too low since the variations in quality and the degree of processing could not be taken into account adequately. Expenditure on meals taken outside the home was probably underestimated. The elasticity at the farm level can be calculated by converting the consumption of the individual food commodities into agricultural raw products on the basis of empirical conversion factors. The converted quantities were valued at constant producer prices (average from 1952-53 to 1956-57) and a regression of this time-series on disposable personal income was calculated. If a double-log consumption function is selected, the elasticity at the producer level amounts to 0.46

66/ (continued): raw product contained in the i-th food commodity. The complete formula would be:

$$\Sigma\left(P_i^F Q_i^F \Big/ \Sigma P_i^F Q_i^F\right)\left[\frac{d\left(\log Q_i^R\right)}{d\left(\log X\right)}+\frac{d\left(\log\left[P_i^F+P_i^M Q_i^F/Q_i^R\right]\right)}{d(\log X)}\right]$$

but the assumption has been made that the weighted average of quality elasticities (when measured as farm prices adjusted for the shares of agricultural raw products contained in food commodities and prices of processing and distributive services added) was very small and could be neglected.

Table 120. – Calculation of demand elasticity coefficients of urban households for food evaluated alternatively at the farm gate, at the retail level, and at the marketing level, Austria

Product	Proportion spent at producer prices 1/	Quantity elasticity 2/
	Percent	b_i
(A) Bread grain	14.47	-0.034
Other grain	0.31	0.170
Sugarbeets	3.13	0.135
Potatoes	1.56	0.206
Vegetables	2.87	0.129
Fruit	3.60	0.606
Pulses	0.34	0.047
Oil seeds	3.20	0.070
Wine	1.28	1.227
All plant products	30.78	0.152
(B) Hogs	15.83	0.259
Beef cattle	12.86	0.311
Calves	4.31	0.518
Poultry	2.33	1.280
Other slaughter animals	0.87	-0.260
Eggs	6.93	0.246
Cow milk	24.63	0.325
Bee honey	1.48	0.749
All livestock products	69.24	0.345
All agricultural products	100.0	0.286
Adjusted elasticity of demand for food: 3/		
Evaluated at farm gate 0.36		
Evaluated at retail level (imports excluded) 4/ 0.52		
Evaluated at retail level (imports included) 4/ 0.55		
Evaluated at marketing level 5/ 0.78		

1/ For human consumption only.

2/ Derived from the Urban Consumption Survey of 1954-55.

3/ Adjusted for influence of household size.

4/ Entirely imported products such as coffee, tea, cocoa, and citrus fruit.

5/ For various processing and distributive services added to agricultural raw products.

for all products and 0.42 for domestically produced products. These elasticity coefficients are slightly lower than the elasticity of total food consumption by volume (quantities weighted at constant consumer prices) estimated as 0.50, because quantitative food consumption is influenced by consumption shifts between various food commodities manufactured from the same basic raw product but subjected to different degrees of processing (e.g., fluid milk, butter, and cheese). According to this calculation, the elasticity of demand for industrial and commercial services included in food consumption expenditure amounts to 0.78 on the average. The conformity to the analogous elasticity derived from the Urban Consumption Survey (0.78) is mainly accidental. The time-series elasticities include the urban as well as the rural population. In contrast to the cross-section surveys, the effects of increasing urbanization (growing transport and distribution services) and of other dynamic factors are included.

In 1959-60 per capita consumption of agricultural raw products (weighted at average producer prices of the period from 1952-53 to 1956-57) was 21 percent higher than in 1950-51 (table 121). The consumption of domestic products had increased only 18 percent. Since, on the other hand, consumption expenditure has increased at least 30 percent, the proportion of the value of agricultural primary products in total food expenditure has shown a declining tendency in the fifties. In 1959-60 this proportion amounted to approximately 64 percent as compared to 69 percent in 1950-51. The proportion would be 61 percent if those products were excluded which could not be produced domestically. It would be 68 percent if those products were included which could not be domestically produced.

1.6 Comparison of Results

Only part of consumption expenditure flows to the domestic agricultural producer; another part is allocated to the food processing and distribution services and finally to foreign suppliers. With rising real income, the nonagricultural proportion in food expenditure generally increases at the expense of the share going to agriculture. The growing difference between consumer expenditure on food and the income of agricultural producers is caused mainly by (1) the upgrading of consumers' purchases due to their rising incomes 67/, (2) the shifting population from farm to urban areas 68/, and (3) shifts in consumer preference for imported goods 69/.

The data from the consumption surveys and the time series of food consumption provide quantitative evidence of these developments.

67/ With rising standard of living, consumers prefer better and more expensive qualities; they buy a larger portion of hygienically packaged, processed, pre-cooked or ready-to-serve food, and they take more meals in restaurants.

68/ The urbanization of the population and the growing variety of consumer goods require more transportation and marketing services.

69/ Consumers have been showing an accelerated propensity for the consumption of those goods which cannot be domestically produced, particularly citrus fruits.

Table 121. - Per capita consumption of agricultural primary products at producer prices, 1950/1960, Austria 1/

Crop year	Based on all food products consumed 2/			Based on domestically produced food products 3/		
	Schillings at constant prices of 1951/52-1956/57	Index 1950/51 =100	Share of agricultural raw products in total food expenditure	Schillings at constant prices of 1951/52-1956/57	Index 1950/51 =100	Share of agricultural raw products in total food expenditure
	AS	Percent	Percent	AS	Percent	Percent
1950/51	2,075	100.0	68.8	2,039	100.0	67.6
1951/52	1,988	95.8	68.6	1,943	95.0	67.0
1952/53	2,106	101.5	65.7	2,056	100.8	64.1
1953/54	2,170	104.5	68.5	2,110	103.5	66.6
1954/55	2,221	107.0	63.7	2,149	105.4	61.7
1955/56	2,356	113.5	66.8	2,282	111.9	64.7
1956/57	2,401	115.7	65.2	2,319	113.7	62.9
1957/58	2,376	114.5	62.8	2,275	111.5	60.2
1958/59	2,576	124.1	65.6	2,486	121.9	63.3
1959/60	2,511	121.0	64.0	2,405	117.9	61.3

1/ Calculated by converting the quantities of food consumed into agricultural primary products by means of empirical conversion factors and evaluating them at average producer prices of the period 1952/53 to 1956/57.
2/ Food commodities which cannot be produced in the country were evaluated at imputed producer prices derived from retail prices assuming processing and distributive margins equal to those of related domestic products. For citrus fruit, the margins for domestically grown fresh fruit were used.
3/ Excludes commodities which are entirely imported (citrus fruit, rice, salt-water fish).

The analysis of the data from the consumption surveys and the time series of food consumption also confirm the general experience that the increase in food consumption related to rising income is relatively small (table 122). The consumption of basic food commodities (like flour and flour products, fluid milk, and lard) is particularly inelastic. For a few products, demand decreases with rising incomes. The consumption of most animal products, such as meat, eggs, and butter, is moderately income elastic. Sizable increases in consumption with rising income can be expected only for a few products, particularly citrus fruit, other fruit, and some cheese items.

For some products the elasticities derived from the three different sources differ considerably from each other. Food consumption of the urban population is more sensitive to changes in income than that of the farm population. The expenditure elasticity of

Table 122. – "Static" and "dynamic" coefficients for quantity elasticities of demand with selections for projection purposes, Austria

Product	Quantity elasticities of demand in relation to total expenditure (or income)			
	Consumption surveys			Time series (range of estimates) 2/
	Urban	Farm	Average 1/	
Flour	-0.03	0.13	0.03	0.01 to 0.03
Edible oils	0.07	0.46	0.14	1.25 to 1.36
Lard and tallow	-0.06	0.23	0.04	-0.23 to -0.62
Beef	0.31	0.56	0.36	0.44 to 0.58
Pork	0.26	0.31	0.28	0.62 to 0.82
Poultry	1.28	0.20	0.86	1.36 to 1.86
All meat 3/	0.32	0.33	0.32	0.48 to 0.66
Eggs	0.25	0.26	0.25	1.29 to 1.73
Whole milk	-0.03	0.13	0.04	0.13 to 0.19
Cheese and cottage cheese 3/	0.38	0.69	0.48	1.01 to 1.36
Sugar 3/ 4/	0.14	0.31	0.19	0.15 to 0.22
Potatoes	0.21	0.05	0.16	-0.23 to 0.26
Vegetables	0.13	0.38	0.20	0.15 to 0.19
Fresh fruit	0.61	0.32	0.50	1.83 to 1.87
Citrus fruit	0.85	1.15	0.88	3.20 to 3.53

1/ Weighted by the proportion of each population group in total consumption.
2/ Excluding extreme values.
3/ For cross-section estimates: elasticities of the items contained in a product group weighted with their respective primary-product equivalent.
4/ Includes sugar content of processed products.

total food demand in relation to total expenditure was estimated as 0.46 for urban households (0.53 if household size is taken into account) and only 0.36 for farm households. The low elasticity of food consumption in farm households is explained mainly by the fact that consumption consists overwhelmingly of home-produced commodities (elasticity coefficient of 0.18). The demand for purchased food commodities (elasticity coefficient of 0.72) shows a higher income elasticity for farm households than for urban households. Also, the study of consumer behavior suggests considerable differences with respect to several products, reflecting partly the degree of self-sufficiency of farm households which varies considerably among products. Thus, the quantity-elasticity of demand for flour products, vegetable oil, lard, cheese, and sugar is higher in farm households, whereas the demand for poultry, cream, potatoes, and fruit is more inelastic for farm households than in urban households.

The differences between the elasticity coefficients of rural and urban households are a result of different consumption patterns and consuming habits of these two population groups. However, they do not pose any special problems for analysis and projection.

The discrepancies between the results of the cross-section analysis (urban and farm consumption surveys) and those derived from time series are much more difficult to interpret. If the elasticity coefficients of the urban and the farm households are weighted according to their proportion in total consumption, the average "static" elasticity coefficients derived by this method are frequently lower than the "dynamic" elasticity coefficients derived from time series. The expenditure elasticity of the demand for total food in relation to total expenditure amounts to an average of 0.51 on the basis of the cross-section analyses, and 0.63 on the basis of the time series. As shown in table 122, the differences between the static and the dynamic elasticities are specially marked in the case of vegetable oils, fruit, cheese and cottage cheese, and citrus fruit.

The differences between static and dynamic elasticities can be attributed to three major reasons. First, the nature of the basic data and series on which computations were based necessarily gives rise to some inadequacies. The results of the time series analysis are particularly inexact because consumption of certain products was not reliably ascertained, the number of observations is small, the successive elements of time series are correlated (autocorrelation), or the determining variables are correlated (multicollinearity). Real prices for citrus fruit and eggs as well as for cheese and sugar (for instance) have decreased continuously in the period of observation, and due to the close multicollinearity it was not possible to separate the effects of income and prices satisfactorily. On the other hand, as already mentioned, the elasticities derived from the Urban Consumption Survey generally are somewhat too low since the influence of household size could not be excluded. According to the Urban Consumption Survey, the elasticity of fluid milk consumption in relation to total expenditure appeared to be slightly negative (-0.03), whereas, according to the time series analysis it was found to be slightly positive (+0.13). If the static elasticity of milk consumption is adjusted for the effect of household size by using the value derived from the Farm Consumption Survey, both elasticities show about the same value.

Second, in contrast to static estimates, dynamic elasticities do not represent the pure income effect, but show it mixed up with other elements. These elements, which did not receive separate treatment in regression analysis, include the continuous urbanization of the population, decreasing household size, the growing interdependence between farms and the market 70/ shifts in the age structure of the population in favor of those capable of gainful employment, and changes in the distribution of personal income. The decisive influence, however, is the change in consuming habits during the past decade. New products have appeared on the market, knowledge of nutrition physiology and medicine have been spread, sales of certain products have been promoted by intensive advertising, and the number of employed women and juveniles has increased.

Third, even if dynamic elasticities represent unbiased estimates of the influence of income changes on consumption, they can still differ significantly from the static elasticities for various reasons. The time series data on average income are lower and cover a much smaller income range than the cross-sectional data. They do not reveal, therefore, the flattening of the elasticities in the upper income ranges. From 1950-51 disposable personal income and total consumption expenditure per capita increased in real

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70/ The elasticity for purchased food commodities is much higher than for home-produced food.

terms about 50 percent. In the Urban Consumption Survey 1954-55, on the other hand, the ratio of the lowest to the highest expenditure level was 1:3.4 for the non-cross-classified data, and more than 1:10 in the data cross-classified by total expenditure and household size (disregarding obviously extreme values). The ratio in the Farm Consumption Survey 1959 was found to be 1:3.9 for cross-classified group averages.

Furthermore, the dynamic elasticities reflect the short-run responses of the same households to income changes during a given period, while the static elasticities are derived from the differences in the consumption of households in various income ranges· (and presumably, also in different social strata and age categories) at a certain point of time. These households have already belonged to that particular income range for a longer time and have more or less completely adjusted themselves to this income level. The elasticities derived from the consumption surveys indicate, therefore, mainly the long-run responses of households to income changes, whereas the time series show the short-run, or temporary, reactions.

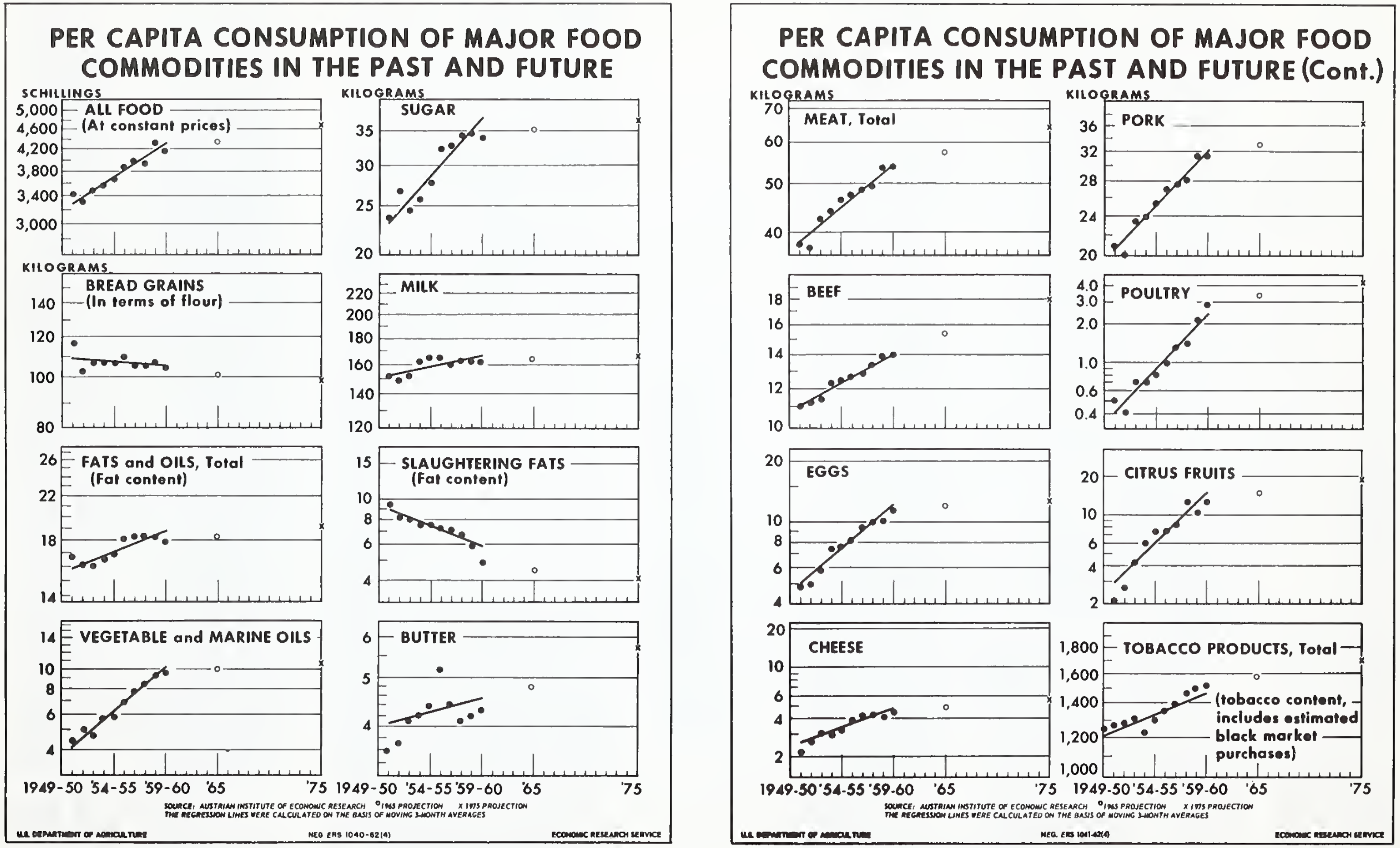
Out of the numerous and partly conflicting factors which can cause differences between static and dynamic elasticities, changes in consuming habits apparently are the most decisive. In most cases (e.g., citrus fruit, fruit, vegetable oils, lard eggs) where dynamic and static elasticities differ considerably, plausible reasons for changes in consumer behavior can be found. In these cases the factors mentioned above can account for only small proportions of the actual deviations.

2. Partitioning Recent Changes in Food and Tobacco Consumption

Having ascertained elasticities of demand in the preceding section, it is now possible to trace the drastic changes which took place in the last decade to (a) changes in real income, (b) changes in real prices of the food items in question and of their close substitutes, and (c) structural changes. By means of so-called "average income elasticities" 71/ it is possible to calculate how much consumption in the period under investigation would have changed if there had been no other changes but the increase in income. Using the price elasticities of demand and the cross-price elasticities as derived from time series, it is possible to estimate the influence of price changes. If marked deviations are found between actual consumption and the consumption expected from income and price changes, it may be surmised that structural factors (especially changes in consumers' preferences) have influenced consumption to a great degree.

At this point it may be noted that real disposable income has increased 62 percent from 1950-51 to 1959-60 while the consumption of individual food and tobacco items developed very unevenly. For citrus fruit and poultry, consumption increased sixfold; for fluid milk and vegetables it remained fairly stable. There was a decline in bread grain products, lard, and potatoes (table 123).

71/ The average income elasticities are obtained by combining the quantity elasticities of demand in relation to total expenditure from the urban and farm consumption surveys, taking the respective shares in total consumption as weights. The elasticities derived from time series do not serve this purpose because they reflect not only the income effect but other effects as well.



PER CAPITA CONSUMPTION OF MAJOR FOOD COMMODITIES IN THE PAST AND FUTURE

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH °1965 PROJECTION X 1975 PROJECTION
THE REGRESSION LINES WERE CALCULATED ON THE BASIS OF MOVING 3-MONTH AVERAGES

U.S. DEPARTMENT OF AGRICULTURE NEG ERS 1040-62(4) ECONOMIC RESEARCH SERVICE

a

PER CAPITA CONSUMPTION OF MAJOR FOOD COMMODITIES IN THE PAST AND FUTURE (Cont.)

SOURCE: AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH °1965 PROJECTION X 1975 PROJECTION
THE REGRESSION LINES WERE CALCULATED ON THE BASIS OF MOVING 3-MONTH AVERAGES

U.S. DEPARTMENT OF AGRICULTURE NEG. ERS 1041-62(4) ECONOMIC RESEARCH SERVICE

b

Figure 33

Table 123. – Recent changes in per capita food consumption by commodities, from 1950/51 to 1959/60, Austria 1/

Food commodity	Per capita consumption: 1959-60 as percentage of 1950-51	Average annual percentage rate of growth 2/
Bread grain products 3/	88.8	- 0.37
Cereal preparations	72.9	- 0.96
Butter	119.4	+ 1.47
Vegetable fats and fish oil	213.6	+10.09
Lard and tallow	52.1	- 4.60
Total fats and oils 4/	106.6	+ 1.97
Beef	126.4	+ 2.68
Veal	96.6	- 0.20
Pork	151.2	+ 5.13
Poultry	560.0	+21.45
Other meat	119.2	- 0.22
Total meat	143.0	+ 4.02
Eggs	239.6	+10.52
Cow milk	106.9	+ 0.95
Cream	257.1	+14.48
Cheese and cottage cheese	200.0	+ 7.59
Sugar	146.2	+ 5.36
Potatoes	84.1	- 1.49
Vegetables	107.9	+ 0.99
Fresh fruit	111.9	+ 5.86
Citrus fruit	595.2	+20.15
Total food 5/	122.5	+ 3.08
Calorie intake	105.9	+ 1.65
Protein supply	108.6	+ 1.49
of which animal protein	131.4	+ 3.11
Fat	116.3	+ 2.73

1/ Calculated on the basis of the Food Balances prepared by the Ministry of Agriculture and Forestry and the Economic Section of the Ministry of the Interior.
2/ Based on the regression of triennial moving averages of consumption on time, using a semi-logarithmic function.
3/ In terms of flour equivalent.
4/ In terms of pure fat content.
5/ Consumption at constant average prices of the period from 1952/53 to 1956/57.

Products may be grouped for discussion purposes as (a) citrus fruit, other fruit and vegetables; (b) fats and oils; (c) dairy products; (d) meat; (e) eggs and cheese; (f) sugar; (g) bread grain products, cereal preparations, and potatoes; and (h) tobacco products. To show the per capita consumption of major foods see figure 33 a and b.

1. The strongest increase during the decade is shown by the consumption of citrus fruit; other fruit and vegetables showed more moderate increases. In the case of citrus fruit, the per capita consumption in 1959-60 of 12.5 kilograms was almost 6 times the 1950-51 consumption. Consumption increased, on the average, at the rate of about 20 percent per annum. It decreased only in 1958-59, when exceptional quantities of home-grown fruit were available. While total food consumption reached its prewar level only in 1954-55 by quantity and in 1955-56 by caloric content, the consumption of citrus fruit was already in 1952-53 almost as high as before the war (4.2 kilograms as compared with 4.4 kilograms). This strong increase in consumption cannot be completely explained by higher incomes, cheapened supplies (owing to liberalization of imports), and the concurrent price increase for home-grown fruit. Based on the income elasticity of demand 72/ the 62 percent rise in real income between 1950-51 and 1959-60 can at most account for an increase in consumption of 60 to 70 percent. The influence of price explains at most an additional increase in consumption of about 115 percent between 1950-51 and 1959-60. The real price for citrus fruit has declined continuously over the past decade - in all about 55 percent. The price of home-grown fruit varied with the harvest, but on the average it increased about 30 percent. So, citrus fruit cost in 1959-60 only about twice as much as home-grown fruit, while in 1950-51 the price still was about 5 times as high. The price elasticity for southern fruit, as calculated from time series, seems to be about 1.2, and the cross-price elasticity (in relation to home-grown fruit) is about 1.7. It should be noted, however, that time series do not give reliable results because income and price are highly correlated, and their effect can not therefore be separated satisfactorily. The combined influence of price and income changes should therefore have increased consumption about three and one-half times, while in fact it increased sixfold. The remaining increase, of about 70 percent, is probably due to changes in consumers' preferences. Citrus fruit is preferred by consumers above all because of the high vitamin content. The physiological importance of vitamins has been more generally recognized and publicized by the press in recent years, and the advertising of fresh fruit juices has also stimulated demand. For the same reason, the consumption of manufactured fruit juice has increased greatly especially in recent years. Its consumption reached 2.5 kilograms in 1959-60 which is two-thirds higher than 1955-56.

The consumption of home-grown fruit has increased in the Fifties on the average at the rate of 5.9 percent per annum, with strong yearly fluctuations. This increase, too, is greater than might have been expected on the basis of income effect and in view of the partial replacement of home-grown fruit by citrus fruit. On the basis of the rise in income

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72/ E.g., the income elasticity for southern fruit has been estimated at 0.88 on the basis of the family budget surveys in the previous section. In other countries (see Agrumes, "Examin de perspectives de la production et de la consommation," FAO No. 59/5/3329, April 22, 1959), cross-sectional elasticities in relation to total expenditure or income have been calculated for citrus or southern fruit which range from 0.58 (Great Britain) to 1.19 (Federal Republic of Germany).

over the decade, one should have expected an increase in consumption of 27 percent for the entire period or just below 3 percent per annum. The income elasticity derived from budget data was estimated as 0.5 on the average. Modern dietary doctrine favors fruit not only because of its high content of vitamins and of mineral salts but also because it is relatively low in calories. In addition, fruit can be used almost without kitchen preparation and save time for employed housewives.

The consumption of vegetables increased in the decade about 8 percent (at the rate of just below 1 percent per annum), about as much as would be expected on the basis of the estimated price and income effects. The income elasticity of 0.19 (calculated from time series by multiple regression of consumption on income and prices) agrees with the average income elasticity of 0.20 derived from the urban and farm budget surveys. This agreement may be fortuitous because the time series of vegetable consumption are crude estimates.

2. The total consumption of fats and oils increased moderately from 1950-51 to 1956-57 (about 14 percent) but has declined since then by 3 percent in 1959-60. The pattern of demand has shifted strongly in favor of vegetable fats, and their share in the total consumption of fats and oils increased from 26 percent to 47 percent. Per capita consumption of vegetable fats has increased fairly steadily from 4.3 kilograms in 1950-51 to 8.1 kilograms in 1959-60 (a rise of about 88 percent). Increased demand represented mainly cooking oils as well as margarine and coconut fat; the sales of olive oil as well as lard-margarine and compound lard has remained almost constant. Cooking oils and coconut fat have been substituted for lard because they are cheaper and because they are considered healthier.

The average price of cooking oils was substantially lower than the average of imported and home-produced lard (weighted with the respective shares in consumption). The difference ranged from 12 percent (1950/51 and 1953/54) to 36 percent (1952/53). Coconut fat was from 2 percent (1953/54) to 26 percent (1957/58) cheaper than lard.

The per capita consumption of cooking oils increased from 1.3 kilograms in 1950/51 to 3.9 kilograms in 1959/60 (a 200 percent increase), while the annual consumption of lard declined continuously from 9 kilograms to 4.6 kilograms (a 49 percent decrease). Coconut fat was consumed to the extent of about 0.6 kilogram per capita in recent years, as compared with 0.1 kilogram in 1952/53 (separate data are not available for earlier years). The combined consumption of the three kinds of fats has changed little over the past decade; it fluctuated between 9.1 kilograms (1959/60) and 10.5 kilograms (1955/56).

Milk margarine, especially the high-grade "dairy" type, is now frequently purchased as a substitute for butter. Per capita consumption of this margarine increased steadily from 0.8 kilogram in 1952/53 (no production in earlier years) to 4.1 kilograms in 1958/59 and by 1959/60, consumption was almost three times as high as total margarine consumption before the war. Butter consumption increased on a per capita basis from 3.6 kilograms in 1950/51 to 5.2 kilograms in 1955/56 (of which 0.5 kilogram was welfare allocations). In 1957/58 after high-grade margarine became available, butter consumption decreased 1.1 kilograms and has remained almost unchanged since that time. The prewar level of consumption (depressed because of high unemployment) had been almost reached in 1948/49, and has been exceeded in recent years by only 19 percent.

The substitution of "dairy" margarine for butter in recent years (in contrast to the substitution of vegetable fats for lard) is not based on nutrition theory. It is mainly due to the fact that high-grade margarine tastes approximately like butter and is 45 percent lower in price. The following comparison shows how much the price relation between butter and margarine influences consumption. Before the war the price ratio of ordinary milk margarine and butter was about 1.6 and the ratios of consumption levels were about 2.4. Now margarine is relatively cheaper and is consumed almost as much as butter. The increase in the relative price of butter has caused an approximately equal decline in the relative consumption of butter. 73/

3. As far as eggs and cheese are concerned, the growth in consumption over the past decade has been at rates of 10.5 percent per annum for eggs and 7.6 percent per annum for cheese.

Eggs showed the greatest increase in consumption of all animal products. Approximately 206 eggs were consumed on a per capita basis in 1959/60, which was 140 percent more than in 1950/51 and 72 percent more than before the war. Consumption has increased more than could be expected as the result of increased incomes and the decline in the real prices of eggs. According to rough estimates, these two factors could explain only an increase in consumption of about 50 percent. The average income elasticity on the basis of budget survey was estimated at 0.25. Additional reasons for the increased consumption of eggs are that they contain few calories, can be prepared with little trouble, and (because of their high digestibility) are preferred by aged persons and people with dietary problems. The lively demand for pastries (which has been stimulated by high incomes and the growing number of young workers) has probably also played a role. The shift from homemade to manufactured pastries, on the other hand, has not influenced egg consumption significantly.

At most, 30 to 40 percent of the rise in cheese consumption in the past decade can be accounted for by increased income. 74/ A further part of the increase can be explained by the decline in the real price of cheese since 1952/53 (11 percent until 1958/59). Price effects cannot be estimated accurately because of the close correlation between income and the price of cheese. Nevertheless, there remains an unexplained residual.

4. Meat consumption has increased comparatively little. In 1959/60 about 54 kilograms of meat were consumed on a per capita basis which was 43 percent more than in 1950/51 (37.7 kilograms) but only 11 percent more than before the war. Over the decade of the Fifties, the annual rate of growth was 4 percent on the average. The greatest percentage increase is shown by poultry at 21.4 percent per annum. This represents an increase of 2.3 kilograms which does not influence the total meat consumption very much. The consumption of pork increased 10.6 kilograms or at the rate of 5.1 percent per annum. The consumption of beef rose 2.9 kilograms per capita (i.e., growth rate of 2.7 percent per annum), while that of veal has declined since 1954/55 (at the rate of 0.2 percent per annum). Correspondingly, the share of pork and poultry in total meat consumption (which was 55 percent and 1 percent, respectively, in 1950/51) increased to 58 percent

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73/ Similar results are obtained in a study for the years 1954 to 1958 relative to Great Britain. See J.A.C. Brown, The Demand for Butter Margarine and Cooking Fats in the United Kingdom, 1954-58, FAO/58/8/6525.

74/ The average income elasticity based on budget data amounts to 0.48.

and 5 percent in 1959/60; the shares of beef and veal declined from 29 percent and 8 percent to 26 percent and 5 percent, respectively. Before the war the meat in the average person's diet was composed of 58 percent pork, 27 percent beef, 6 percent veal, 2 percent poultry, and 7 percent other meat.

That the demand for poultry increased faster than total meat consumption is partly due to its high income elasticity. The average elasticities on the basis of budget surveys are 0.86 for poultry, 0.52 for veal, 0.36 for beef, and 0.28 for pork. In addition, the real price of poultry has declined 8 percent from 1955/56 to 1958/59, whereas that of veal rose 20 percent owing to insufficient supply. On the average, poultry was 41 percent more expensive than veal in 1950/51, but cost only 5 percent more in 1958/59. Due to the change of relative prices, many consumers have preferred poultry to veal.

The consumption of poultry and veal taken together did not rise more in recent years than was to be expected as a result of the rise in income. The income elasticity for veal and poultry together was estimated at an average of 0.70 on the basis of the urban and rural budget surveys. As real income rose 19 percent from 1955/56 to 1959/60, an increase in consumption of 13 percent might have been expected. Actually, consumption increased 22 percent. The difference can be explained by the fact that both kinds of meat are eaten comparatively often in restaurants and this expenditure (the income elasticity of which is very high) is not taken into account in the above calculation. Also, the average level of consumption in the budget surveys (6.3 kilograms) is much higher than in the time-series (4.6 kilograms).

Shifts in consumption between beef and pork were favored by the development of prices and by the steadily growing preference of consumers for quick preparation. The increased use of steam pressure cookers has not fully compensated this tendency. The share of both beef and pork in total meat consumption was 84 percent in 1959/60 and just as high in 1950/51. Up to 1954/55 beef was on the average 2 to 20 percent cheaper than pork, but 3 to 5 percent more expensive since then.

The rise of total meat consumption since 1950/51 can satisfactorily be explained by the changes in real incomes and prices 75/. Meat consumption in restaurants is very income-elastic.

5. The consumption of fresh whole milk has been fairly stable over the last decade; the average growth rate was only 0.95 percent per annum. Per capita consumption was 151 kilograms in 1950/51 and has increased only to 165 kilograms by 1955/56 where it leveled off and remained at about 162 kilograms since that time. The demand for milk is affected only slightly by changes in income and prices. On the basis of the budget surveys,

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75/ On the basis of time-series, the price elasticity for meat was estimated at 0.05, and the income elasticity at 0.49. On the basis of budget surveys, the average income elasticity was estimated as 0.32. Various reasons may be given for this comparatively small difference. In the first place, the elasticities derived from the urban survey were mostly too low because it was not possible to separate the influences of income and household size. Furthermore, the time-series analysis referred to a lower average level of consumption (47 kilograms) than the budget surveys (53 kilograms).

the average income elasticity amounts to 0.04 (unadjusted value) or to 0.12 (after adjusting the biased elasticity obtained from the urban survey) by means of an estimate of the elasticity of "household size" derived from the farm survey. The price elasticity of the demand for milk could not be reliably estimated from time-series data because the real price of milk changed only little. According to the experience of other countries, it probably would have been estimated in the range -0.1 to -0.2. Quite likely the decline of the rural population has reduced consumption because (according to the budget surveys) farm households consume somewhere around 70 percent more milk than urban ones. For most other foods the differences in the level of consumption are much smaller.

In contrast to the fairly stable milk consumption, the consumption of cream increased at the average rate of 14.5 percent per annum from 1950/51 to 1959/60. However, most of this increase occurred since 1954/55. Two reasons for the rapid increase in demand are (i) the fact that the average level of consumption was very low prior to 1954/55 and (ii) there has been a strong increase in the demand for pastries which require much cream. The same two reasons explain also why the income elasticity from time-series (estimated at 2.0) is much higher than that from the urban survey (estimated at 0.63) which does not take account of the cream used in manufactured products. The farm household survey did not yield any comparable estimates of the elasticity for cream because the consumption stated frequently included the amounts used for making butter.

6. Sugar consumption increased about 46 percent in the past decade, from 23.6 kilograms in 1950/51 to 34.5 kilograms in 1958/59. However, owing to price increases, consumption of sugar declined slightly in 1959/60. The rise in consumption since 1950/51 has been partly due to higher real income, partly due to reduced real prices of sugar, and partly due to other factors. Although households do not buy much more sugar when incomes rise, 76/ the demand for products rich in sugar content (pastries, sweets, chocolates, jams, etc.) is highly income-elastic. About one-fourth of the increase in consumption can be traced back to incomes increasing 62 percent over the past decade; the remaining increase in consumption can be partly explained by the reduction in the real price of sugar by 18 percent. If products high in sugar contents are combined with sugar by weighting the elasticities by the respective sugar content a combined income elasticity of 0.2 is obtained for sugar. The price elasticity of -1.32 for sugar, as calculated by the regression of consumption on income and price, is probably incorrect as the two explanatory variables are closely correlated. In addition, the demand for sugar was stimulated by the growing number of young people earning money and women having jobs who consume more sweets, pastries, etc., and by the increasing consumption of coffee (which is more and more frequently prepared as "espresso").

7. Consumption of bread grain products, cereal preparations, and potatoes has tended to decline. As averages for the period 1950/51 to 1959/60, the annual rates of shrinkage were 0.4 percent for bread grain products, about 1 percent for cereal preparations, and 1.5 percent for potatoes. This decline cannot be explained by developments in incomes.

The income elasticities derived from the budget surveys are negative only for cereal preparations; on the average the income elasticities are slightly positive for bread grain products (estimated at 0.03) and potatoes (estimated at 0.16). In the case of potatoes,

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76/ The income elasticity derived from the budget surveys was estimated at an average of 0.13.

however, the time-series data are probably not too reliable. Potato consumption is difficult to estimate for the purpose of food balances because a considerable share of the total production is fed to livestock. The figures published for the first years of the period under review turned out to be too high after the results of the urban survey of 1954/55 became known, and they have been gradually reduced to the per capita level as shown by the survey data. For bread grain products, the tendency can probably be explained by the assumption that in 1950/51 the demand for these products was still relatively high owing to the scarcity of other foods and that it has become normal since. In addition, the shifts in consumption patterns favor fruit, cheese, eggs, and sugar products, probably causing households to reduce the consumption of other foods. These shifts have been induced by the dissemination of nutritional and medical knowledge and by the growing number of women and juveniles earning money.

8. The growth in total tobacco consumption over the last 10 years may be characterized as a shift in demand from smoking tobacco to cigarettes and from cheap to more expensive brands. The over-all growth in consumption in terms of tobacco content (represented by a 21 percent increase from 1950 to 1960) can be mainly explained by the increase of incomes and the reduction of relative prices. Real disposable personal income has risen about 80 percent from 1950 to 1960, while real prices of tobacco products (weighted with consumption in 1954) have declined on the average about 29 percent. The income and price elasticities of the demand for tobacco products were estimated in terms of weights derived by regression analysis of time-series to 0.37 and -0.32, respectively (including black market purchases, the estimates were 0.30 and -0.08 respectively). These estimates are statistically significant and hardly too high.

Cigarettes are a relatively expensive high-grade tobacco product making their demand more income-elastic than the demand for cheaper tobacco products. In the past decade 1 kilogram of tobacco in the form of cigarettes cost on the average 3-1/2 times as much as 1 kilogram of pipe tobacco (before the war the ratio was 5.75 to 1). Furthermore, changes in relative prices have influenced the pattern of consumption, and consumers' preferences have changed. 77/

As more and more women find employment the number of women smoking tends to increase. The rural population (whose consumption of tobacco is more than average) has decreased steadily. Also, the pace of modern everyday life favors goods ready for use, and leaves little time for the leisurely smoking of cigars and pipes, or for the home preparation of cigarettes.

3. Projected Consumption of Food and Tobacco

Demand during the Sixties is projected in this section by combining (a) the results of the detailed analysis of major factors influencing demand with (b) stated assumptions

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77/ While the average price of cigarettes (prices of the various brands weighted with their respective market shares) was only about 5-1/2 times as high in 1960 as in 1936, the prices of the other tobacco products have risen to 7 to 10 times their prewar level.

relating to the rates of growth in population, urbanization, and income, and a number of other assumptions which are either taken to remain unchanged or whose influence on demand do not allow quantitative determination. As such, the projections involve not only personal judgment but are also conditioned by assumptions made about future movement in a number of basic economic aggregates. All the projections presented here were made at constant price relationships. At a later stage these demand projections are confronted with supply projections, and placed within the framework of the general model of economic growth in order to check over-all consistency. This confrontation and adjustment of demand and supply projections will be done in the next chapter, and the role of price determination and other market regulations directed toward demand-supply reconciliation will then be considered.

The first step in working out demand projections was to (a) specify the "projection periods" as extending from the "reference (or base) period" of 1959-60 for food and 1960 for tobacco to the "target years" of 1965 and 1975 and (b) to establish for the reference period the level of per capita consumption that existed for individual food and tobacco commodities. The reference period used was the period for which the last consumption data were available in the food balances. The extrapolation of future consumption on the basis of the actual consumption levels existing on the reference period has the disadvantage of carrying over into the prognosis the random fluctuation of this particular observation. However, this error is rather insignificant in our case since in the past decade consumption has developed fairly steadily. As far as cyclical fluctuations are concerned, their effects have been eliminated by relating the income projections to a full employment economy.

The second step was to work out projections for rates of change in per capita consumption of individual food and tobacco commodities and, utilizing these rates, to work out projections for trends in per capita consumption in the target years of 1965 and 1975. The objective of this step was the linking of the elasticities (expenditure and quantity) of demand derived from cross-section and time-series data with probable growth of income and urbanization, plus other assumptions. The per capita consumption was projected in terms of (a) the quantities of respective commodities consumed and (b) expenditure levels on individual commodities.

The third step was to work out projections of the total demand of the Austrian economy for food and tobacco in the target years of 1965 and 1976 both in terms of (a) quantitative consumption and (b) consumption expenditure, by multiplying projected per capita consumption (in quantities and expenditure) by the appropriate population projections.

The results of these three steps are demand projections which take into account income, population, and proportion of the urban and rural population groups and subjectively assess the possible effects of other factors influencing demand (changes in consuming habits, shifts in the age structure of the population, and changes in average household size) which did not allow for quantitative determination. Income, population, and urbanization were considered to be the major factors responsible for movements in demand during the sixties at constant prices.

3.1 Basic assumption about major economic aggregates

Since demand projections are conditioned by the basic assumptions made, the hypotheses made about basic economic aggregates are summarized at the outset. The projections which form the basis for assumptions for total population as well as for income and proportion of the urban and the rural population groups have all been taken over from projections developed in Chapter II (table 124).

According to these projections, the size of the population will be 7,225,400 in 1965 and 7,463,300 in 1975. In 1965 the population will exceed the reference period by 159,000 if based on 1959-60, and by 142,000 persons based on 1960. From 1965 to 1975 the population will increase by another 238,000.

With regard to the occupational pattern and urbanization tendency, it was assumed that the proportion of people employed in agriculture will decrease from approximately 31 percent in 1959-60 to 29 percent in 1965, and to 27 percent in 1975.

Table 124. – Major assumptions made about basic economic aggregates for purpose of demand projection, Austria

Target and reference year	Real per capita personal income		Population in 1,000 persons	Distribution of the population 1/	
	1959-60 = 100	1960 = 100		Urban (percent)	Rural (percent)
1959-60				69	31
1965	122.3	117.9	7,225.4	71	29
1975	171.4	165.1	7,463.3	73	27

1/ The distribution of the population is based on the relationship of the population groups covered by the Urban and the Farm Consumption Survey (according to the basic total of the sample).

The level of national income will reach about 106.5 billion Austrian schillings in 1965 and 154.1 billion schillings in 1975, at prices of 1951. Compared with 1959-60, per capita national income will be 22 percent higher in 1965 (a rise of 3.73 percent per annum) and approximately 71 percent higher in 1975 (annual growth rate of 3.54 percent). The comparison with the 1960 level shows respective increases of 18 percent (3.35 percent per annum) and of 65 percent (3.40 percent per annum). The annual growth rates beginning with 1959/60 are somewhat higher than those calculated on the basis of 1960, because from 1959 to 1960 the rise in national income was particularly large (about 8 percent) due to the cyclical upswing. For disposable personal income and personal consumption expenditure per capita, the same growth rates have been assumed. This assumption is justified if the sum of personal taxes, social contributions, undistributed profits, government income, and transfer incomes will develop at the same rate as national income, and if the proportion of savings from personal income will show a long-term constancy. On the basis of the recent development in Austria, both conditions seem to be justified. Due to the lack of statistical evidence, it had to be further assumed that per capita disposable personal income of the urban and the rural population groups will increase at equal rates.

3.2 Projecting Demand in Terms of Per Capita Consumption

Concerning methodology, the projections of demand in terms of per capita consumption of food and tobacco commodities were worked out on the basis of the expected rise in income per capita, and cross-section and time-series elasticities utilizing the double-logarithmic and the logarithmic-inverse consumption functions. The analysis of factors affecting demand (discussed earlier) contained an estimated quantity and an expenditure elasticity coefficient for each commodity calculated for the Farm Consumption Survey. A similar pair of elasticity coefficients from the Urban Consumption Survey was available and (depending on the commodity and the number of explanatory variables) up to five different elasticity coefficients from time-series. From time-series elasticities future per capita consumption was calculated on the basis of expected future income effect but with intermingling of other dynamic factors, especially changes in consuming habits. The future per capita consumption from cross-section elasticities was based not only on expected income effect but also on the expected future urbanization effect and in some cases, the effect of changes in household size. The elasticities for tobacco products derived from the consumption surveys were not used for projection since their reliability for this purpose was questionable by the fact that average per capita consumption in households covered by the surveys was far below actual per capita consumption (especially so for expenditure) relating to the entire population.

Various decisions were made on the estimated elasticity coefficient available from cross-section and time-series analysis. Therefore, further computations had to be made in order to employ them meaningfully for demand projections. From 2 to 6 calculations were made relating to the future per capita consumption for each commodity and target year from estimates available. These estimates differed from each other according to value of the elasticity coefficient selected and the type of consumption function employed 78/. The procedure by which operations and calculations were carried out can be summarized as follows:

78/ The number of projections made may be further broken down as follows:

(i) four projections were made on tobacco for each target year;
(ii) from 3 to 6 projections were made on food commodities for the target year of 1965;
(iii) from 2 to 6 projections were made on food commodities for the target year of 1975.

The different projections imply different assessments of those factors influencing demand which did not allow for an exact determination and could not be numerically incorporated into the quantitative projection procedure.

Table 125. – Values selected for the quantity elasticities of demand in relation to income and total consumption expenditure for projection of future food and tobacco consumption, Austria

Commodity	Income elasticities	Total expenditure elasticities	
	Derived from time-series analysis	Derived from cross-section analysis of	
		Urban 8/ households	Farm 9/ households
Wheat flour 1/	0.01	-0.02 (0.02)	0.15
Rye flour 1/		-0.06	0.10
Cereals	-0.02	0.17	-0.40
Edible oils 2/	1.36	0.07	0.46
Lard and tallow	-0.23	-0.06	0.23
Beef 3/	0.47	0.31 (0.39)	0.56
Veal	0.29	0.51	0.64
Pork 3/	0.63	0.26 (0.36)	0.31
Poultry	1.36	1.28	0.20
Other meat	-	-0.26	0.22
All meat 3/	0.49	0.32 (0.40)	0.33
Eggs	1.29	0.25 (0.29)	0.26
Whole milk	0.13	-0.03 (0.11)	0.13
Cream	2.02	0.63	-0.66 (0.25)
Cheese	1.09	0.63	1.20
Cottage cheese		-0.01	-0.22
Butter	7/ 0.69	0.66	0.75
Sugar 4/	0.22	0.14	0.31
Potatoes	-0.25	0.21	0.05
Vegetables	0.19	0.13 (0.27)	0.38
Fruit	1.83	0.61 (0.66)	0.32
Citrus fruit	3.20	0.85	1.15
Total food 5/	0.50	-	-
Total tobacco products 6/:			
by weight	0.37 (0.30)	-	-
by volume 5/	0.51 (0.43)	-	-
Cigarettes	0.58 (0.49)	-	-

1/ All bread grain products are converted into flour equivalent on the basis of their raw material content. 2/ Including margarine, compound lard, coconut fat, etc. converted into oil equivalent. 3/ Including processed meat (sausages, smoked ham, canned meat, ground meat. 4/ Including sugar content of processed products. 5/ Quantities at constant prices. 6/ The figures in parentheses refer to elasticity coefficients derived from time-series of tobacco products including black market purchases. 7/ Estimates (average of the elasticities for urban and farm households weighted by estimated proportions of consumption. 8/ The figures in parentheses refer to elasticities adjusted for the influence of household size. The correction was made on the basis of the elasticities in relation to household size derived from the Farm Consumption Survey. 9/ The elasticity for cream (in parentheses) is an imputed value.

a. Selection of the most suitable income-elasticity coefficient for each food commodity was made from the set of available time-series coefficients, with selection generally being from the income-elasticity coefficient obtained from multiple regression of consumption on income and the respective commodity's own price (table 125). 79/

b. Efforts were made to obtain uniform commodity coverage to match the commodity nomenclature of the budget surveys to the primary material nomenclature of time-series consumption derived from the food balances, with cross-section elasticities for commodities manufactured of the same primary products (i.e., meat, sausages, smoked ham, or flour-bread-cereals) combined to primary products elasticities according to their primary-material content (calculated on the basis of empirical conversion factors) as weights (table 125).

c. Adjustment of the elasticity coefficients for certain commodities (wheat, flour, beef, pork, ham and bacon, sausages, ground meat, total meat, fluid milk, vegetables, fruit) available from the Urban Consumption Survey for the omitted influence of household size, making use of the estimated quantity and expenditure elasticities of demand in relation to household size derived from the Farm Consumption Survey data and the elasticity coefficient of household size in relation to total expenditure obtained from the urban survey 80/ (table 125 for adjustments to quantity elasticities).

d. Calculation of future relative changes in, and levels of, per capita consumption on the basis of time-series elasticities (selected for the reference period) and expected increases in income for two consumption functions (double-log and log-inverse), which could be carried out in a straight forward manner (according to the formula in table 126) since time-series elasticities were estimated for the Austrian population as a whole and were matched to the per capita consumption derived for the reference period from the Food Balance Sheets.

e. Calculation of future relative changes were made in per capita consumption on the basis of cross-section elasticities (selected for the reference period) and expected increases in income for two consumption functions (double-log and log-inverse), with due consideration given (according to the formula in table 126) to the fact that cross-section elasticities have been estimated to reflect separately consumer behavior in the urban and farm-household sectors.

79/ For such commodities as citrus fruit and flour and cereal the elasticity derived from simple regression was used; for poultry the elasticity that proved to be most useful had been derived from multiple regression of consumption on income and on poultry and veal prices; the coefficient selected for veal resulted from the regression of consumption on income and on a trend factor.

80/ The Houthakker-Gore adjustment (see Section 1.1 of the present chapter) was carried out according to the formula

$$b_a = b_o - cd$$

where b_a is the unbiased elasticity coefficient of demand in relation to total expenditure, b_o the biased elasticity derived from urban survey data, c the elasticity of demand in relation to household size available from farm survey data, and coefficient d is the elasticity of household size in relation to total consumption expenditure estimated at 0.84 from urban survey data.

Table 126. – Calculation of expected future demand in terms of per capita consumption (C_T), Austria 1/

Source of income elasticities for reference period	Definitional formula 2/	Derivation based on logarithmic consumption function 3/	Derivation based on logarithmic consumption function 4/
Time-series	$C_R\left[1+\frac{C_T - C_R}{C_R}\right]$	$C_R\left[\left(\frac{X_T}{X_R}\right)\right]^b$	$C_R\left[\left(1-\frac{X_T}{X_R}\right)^b\right]$
Cross-section analysis	$C_R\left[1+\frac{C_T - C_R}{C_R}\right]$	$C_R\left[\left(\frac{X_T}{X_R}\right)^b\right]$	$C_R\left[\left(1-\frac{X_T}{X_R}\right)^b\right]$
	$C_R\left[1+\frac{C^A_T - C^A_R}{C^A_R}\right]$ or $C\left[\frac{P^f_T C^f_T + P^\mu_T C^\mu_T}{P^f_R C^f_R + P^\mu_R C^\mu_R}\right]$	$C_R\left[\frac{P^f_T C^f_T\left(\frac{X_T}{X_R}\right)^{b_f} + P^\mu_T C^\mu_R\left(\frac{X^{b_\mu}}{X_R}\right)}{P^f_R C^f_R + P^\mu_R C^\mu_R}\right]$	$C_R\left[\frac{P^f_T C^f_R\left(1-\frac{X_T}{X_R}\right)^{b_f} + P^\mu_T C^\mu_R\left(1-\frac{X_T}{X_R}\right)^{b_\mu}}{P^f_R C^f_R + P^\mu_R C^\mu_R}\right]$

1/ Here C denotes the level per capita consumption (expressed alternatively in quantities and expenditure). X income per capita in the reference period (subscript R) and in the target years (subscript T), superscripts μ and f denote urban and the farm sector, superscript A denotes a weighted average with the proportions of the urban and the farm populations (P^f and $P\mu$) used as weights, b denotes the average elasticity of demand in relation to income (or total expenditure).

2/ C_R is derived for the reference period from the official Food Balance Sheets; while C^f_R and C^h_R represent figure as apparent from the two household surveys (with figures from Urban Consumption Survey of 1954/55 blown up to the reference period level).

3/ Based on relative changes of per capita consumption as derived for the double-log function as: log (CT/CR) = b log (XT/XR).

4/ Based on relative changes of per capita consumption as derived for the log-inverse function as: (CT/CR) = b log (1 - XT/XR).

Table 127. – Alternative projections of expected future demand in terms of quantities consumed per capita of food and tobacco products, by commodities, 1965 and 1975, Austria 1/

Commodity	Estimated values for 1965 2/						Estimated values for 1975 2/					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
	(a) Relative change in per capita consumption (1959-60 = 100)											
Wheat flour 3/	100.2	100.2	100.5	101.0	100.4	101.0	100.5	100.4	101.3	102.9	100.9	102.1
Rye flour 3/			99.2	-	99.3	-	–	–	98.4	-	98.4	-
Cereals	99.6	99.6	97.1	-	97.1	-	98.9	99.2	94.8	-	94.7	-
Edible oils 4/	131.1	127.8	104.1	-	103.8	-	207.4	175.9	110.1	-	108.4	-
Lard and tallow	95.5	95.9	100.4	-	100.3	-	88.4	90.9	101.1	-	100.6	-
Beef 5/	109.8	108.9	108.6	110.1	107.9	109.2	128.7	121.6	123.6	128.1	118.4	121.8
Veal	105.9	105.4	113.6	-	112.4	-	116.8	112.8	138.4	-	130.0	-
Pork 5/	113.4	112.0	104.0	105.2	103.5	104.5	140.2	129.9	112.4	115.9	108.6	111.2
Poultry	131.1	127.8	118.9	-	116.8	-	207.4	175.9	166.0	-	146.6	-
Other meat	-	-	97.6	-	97.6	-	-	-	93.6	-	95.4	-
Total meat 5/	110.2	109.2	106.1	107.2	105.4	106.5	130.1	122.6	117.6	121.2	113.2	115.8
Eggs	129.2	126.2	105.0	105.6	104.5	105.0	199.8	170.9	114.1	115.9	110.6	112.0
Whole milk	102.6	102.4	99.5	101.3	99.5	101.1	107.2	105.6	99.4	104.2	99.1	102.8
Cream	149.4	144.0	97.4	109.2	97.4	108.2	295.6	231.3	96.3	128.6	96.1	120.9
Cheese	124.2	121.7	117.3	-	115.5	-	179.5	157.2	153.9	-	139.3	-
Cottage cheese			98.6	-	98.6	-			96.3	-	97.0	-
Butter	114.7	113.3	113.9	-	112.4	-	144.8	133.2	142.8	-	131.4	-
Sugar 6/	104.5	104.1	103.9	-	103.6	-	112.5	109.6	110.7	-	108.2	-
Potatoes	95.2	95.6	103.5	-	103.2	-	87.5	90.1	109.8	-	107.6	-
Vegetables	103.9	103.5	104.3	106.4	103.9	105.8	110.7	108.2	111.5	118.0	108.9	113.8
Fruit	143.9	139.1	109.9	110.6	108.8	109.5	266.9	213.8	130.2	132.8	122.2	124.1
Citrus fruit	189.0	178.1	121.4	-	119.5	-	556.7	377.6	166.4	-	149.6	-
Total food 7/	110.5	109.4	-	-	-	-	130.8	123.1	-	-	-	-
	(1960 = 100)											
Total tobacco products												
by weight	106.3	105.8	105.1	-	104.7	-	120.4	115.7	116.2	-	112.6	-
by volume 7/	108.8	108.1	107.4	-	106.8	-	129.1	122.3	124.0	-	118.5	-
Cigarettes	110.1	109.3	108.5	-	107.8	-	133.7	125.7	127.8	-	121.3	-

Table 127. – Alternative projections of expected future demand in terms of quantities consumed per capita of food and tobacco products, by commodities, 1965 and 1975, Austria 1/ – Continued

Commodity	1956/60	Estimated values for 1965 2/						Estimated values for 1975 2/					
		I	II	III	IV	V	VI	I	II	III	IV	V	VI
	(b) Level of per capita consumption in kilograms (unless otherwise stated)												
Wheat flour 3/	67.4	104.21	104.21	67.74	68.07	67.67	68.07	104.52	104.42	68.28	69.35	68.01	68.82
Rye flour 3/	36.6			36.31	-	36.34	-			36.01	-	36.01	-
Cereals	5.1	5.08	5.08	4.95	-	4.95	-	5.04	5.06	4.83	-	4.83	-
Edible oils 4/	9.4	12.32	12.01	9.79	-	9.76	-	19.50	16.53	10.35	-	10.19	-
Lard and tallow	4.9	4.68	4.70	4.92	-	4.91	-	4.33	4.45	4.95	-	4.93	-
Beef 5/	13.9	15.26	15.14	15.10	15.30	15.00	15.18	17.89	16.90	17.18	17.81	16.46	16.93
Veal	2.8	2.97	2.95	3.18	-	3.15	-	3.27	3.16	3.88	-	3.64	-
Pork 5/	31.3	35.49	35.06	32.55	32.93	32.40	32.71	43.88	40.66	35.18	36.28	33.99	34.81
Poultry	2.8	3.67	3.58	3.33	-	3.27	-	5.81	4.93	4.65	-	4.10	-
Other meat	3.1	-	-	3.03	-	3.03	-	-	-	2.90	-	2.96	-
Total meat 5/	53.9	59.40	58.86	57.19	57.77	56.85	57.34	70.12	66.08	63.79	65.52	61.15	62.44
Eggs, number	206.3	266.54	260.35	216.62	217.85	215.58	216.62	412.19	352.57	235.39	239.10	228.17	231.06
Whole milk	161.8	166.01	165.68	160.99	163.90	160.99	163.58	173.45	170.86	160.83	168.60	160.34	166.33
Cream	1.8	2.69	2.50	1.75	1.97	1.75	1.95	5.32	4.16	1.73	2.31	1.73	2.18
Cheese	2.8	5.46	5.35	3.28	-	3.23	-	7.90	6.92	4.31	-	3.90	-
Cottage cheese	1.6			1.58	-	1.58	-			1.54	-	1.55	-
Butter	4.3	4.93	4.87	4.90	-	4.83	-	6.23	5.73	6.14	-	5.65	-
Sugar 6/	33.9	35.43	35.29	35.22	-	35.12	-	38.14	37.15	37.53	-	36.68	--
Potatoes	87.7	83.49	83.83	90.77	-	90.51	-	76.74	79.05	96.29	-	94.37	-
Vegetables	65.8	68.37	68.10	68.63	70.01	68.37	69.62	72.84	71.20	73.37	77.64	71.66	74.88
Fruit	56.3	81.02	78.31	61.87	62.27	61.25	61.25	150.26	120.37	73.30	74.77	68.80	69.87
Citrus fruit	12.5	23.63	22.26	15.18	-	14.94	-	69.59	47.20	20.80	-	18.70	-
Total food in AS at average prices of 1952-53/1956/57	4,180	4,619.15	4,573.17	-	-	-	-	5,467.74	5,145.86	-	-	-	-
Total tobacco products 8/ by weight (grams)	1,517.6	1,613.21	1,605.62	1,595.00	-	1,588.93	-	1,827.19	1,755.86	1,763.45	-	1,708.82	-
by volume (AS at prices of 1951)	9/ 341.1	371.12	368.73	362.15	-	360.13	-	440.36	417.17	418.13	-	399.58	-
Cigarettes, number	1,334.3	1,469.06	1,458.39	1,447.72	-	1,438.38	-	1,783.96	1,677.22	1,705.24	-	1,618.51	-

Table 127. – Alternative projections of expected future demand in terms of quantities consumed per capita of food and tobacco products, by commodities, 1965 and 1975, Austria 1/ – Continued

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1/ Projections derived according to formulas given in Table 126.

2/ Alternative projections of food consumption designated as to type as follows: Type I (time-series elasticity and double-log consumption function); Type II (time-series elasticity and log-inverse consumption function); Type III (composite cross-section elasticity with urban coefficient unadjusted for household size and double-log consumption function); Type IV (composite cross-section elasticity with urban coefficient adjusted for household size and double-log consumption function); Type V (composite cross-section elasticity with urban coefficient unadjusted for household size and log-inverse consumption function); Type VI (composite cross-section elasticity with urban coefficient adjusted for household size and log-inverse consumption function). Alternative projections of tobacco consumption designated as to type as follows: Type I (time-series elasticity excluding black market purchases and double-log consumption function); Type II (time-series elasticity excluding black market purchases and log-inverse consumption function); Type III (time-series elasticity including black market purchases and double-log consumption function); Type IV (time-series elasticity including black market purchases and log-inverse consumption function).

3/ All bread grain products are converted into flour equivalent on the basis of their raw material content.

4/ Including margarine, compound lard, coconut fat, etc., converted into oil equivalent.

5/ Including processed meat (sausage, smoked ham, canned meat, ground meat).

6/ Including sugar content of processed products.

7/ Quantities at contant prices.

8/ Per capita consumption in 1960.

9/ If estimated prices on the black market are included, the value amounts to 337.2. The figures indicated under estimates of Types III and V are related to this value.

When the methodology was applied to the expected future per capita consumption in terms of quantities consumed, the results obtained were those shown for food and tobacco commodities in table 127. The estimates made from time-series elasticities and the double-log consumption function were generally the highest, while estimates made from unadjusted average cross-section elasticities and the log-inverse consumption function were generally the lowest. Considerable differences were observed, particularly in those commodities for which the demand is income-elastic or where demand has been strongly influenced by changes in consuming habits during recent years. Moreover, the alternative estimates of expected consumption in the target year of 1975 covered a wider range than those for 1965 because the level of elasticity and the type of consumption function carry more weight, the higher the income is assumed to rise. Relatively small differences were observed among the alternative estimates of the expected future per capita figures obtained for flour products, 81/ sugar, 82/ cereal preparations, 83/ vegetables, 84/ butter, 85/ milk, 86/ beef, 87/ and tobacco products, 88/. The deviations among the alternative estimates were somewhat larger for most kinds of meats. 89/ The estimated per capita consumption levels for the other food commodities included, showed considerable differences between the lowest and highest consumption estimates for both 1965 and 1975 as follows: citrus fruit 37 percent and 73 percent, cream 35 and 67 percent, fruit 24 and 54 percent, edible oils 21 and 48 percent, eggs 19 and 45 percent, and cheese (including cottage cheese) 12 and 31 percent. The absolute differences between the lowest and highest per capita figures amounted to more than 1 kilogram in (i) the 1965 estimates for edible oils, pork, eggs, milk, potatoes, vegetables, fruit and citrus fruit, and (ii) in the 1975 projections for beef, poultry, cream, and cheese.

For the final projections of quantities consumed per capita, the 4 to 6 alternative estimates computed for each commodity were scrutinized and the one which seemed to be most meaningful on the basis of physiological, economic, and statistical consideration was selected. For most commodities the estimate developed on the basis of composite cross-section elasticities (with the urban coefficient adjusted for the effect of household size) using a logarithmic-inverse consumption function (estimates of Type VI) were

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81/ The relative differences between the lowest and highest alternative estimates amounted to 0.4 percent for 1965 and 0.8 percent for 1975.

82/ Relative differences of 1 percent for 1965 and 4 percent for 1975 were observed between the lowest and highest estimates.

83/ Relative differences of 3 and 5 percent were observed respectively for 1965 and 1975 between the lowest and highest estimates.

84/ Relative differences of 3 and 8 percent were observed respectively for 1965 and 1975 between the lowest and highest estimates.

85/ Relative differences of 2 and 9 percent were observed for 1965 and 1975 between the lowest and the highest estimates.

86/ Relative differences of 3 and 8 percent were observed for 1965 and 1975 between the lowest and the highest estimates.

87/ Relative differences of 1 and 8 percent were observed for 1965 and 1975 between the lowest and highest estimates.

88/ Relative differences of 1-1/2 and 9 percent were observed for 1965 and 1975 between the lowest and highest estimates.

89/ Relative differences of 11 and 29 percent were observed respectively for 1965 and 1975 for poultry, 9 and 23 percent for pork, and 7 and 19 percent for veal.

selected from the various alternative estimates calculated. The final projection of quantities of tobacco products consumed per capita was made on the basis of the time-series elasticities. For some particular meat products, preference was given to a double-log consumption function; meat consumption appeared to be capable of a larger increase not only because it is still rather low as compared with international levels, but also because meat (with the exception of pork) is relatively low in calories. In a number of cases (grain products, potatoes, and lard) where the results obtained by the described method differed from the clearly recognizable trend in consumption, the future quantities consumed per capita were projected by "free hand" estimates. Reasons against using time-series elasticities for projections on a wider scale included (a) the statistical deficiencies such as small number of observations for estimation as well as autocorrelation and multicolinearity, (b) the possibilities that the use of time-series elasticities for projection produce levels of consumption which would be unreasonably high because strong shifts in consuming habits in recent years would be implicitly assumed to continued unchanged for the future, 90/ and (c) the intermingling in time-series elasticities of dynamic factors with a genuine income effect on consumption.

Also affecting the selection for final projection were (a) the expected shifts in the age structure in favor of young and aged persons, 91/ (b) the continued decreases expected in average household size, due to increasing wealth, marriage at earlier age, and decreases of the rural population, and (c) the strong possibility that the present average per capita energy intake of 2,950 calories per day is already close to the limit and can be increased only moderately in the future. 92/ The limitation on the increase in food consumption will be brought about by lower food requirements of children and aged persons. The tendency of rising per capita consumption brought about by decreasing household size is not enough to offset the impact of the age structure. When placed within the framework of other European countries with relatively higher income, it had to be assumed that the consumption of many products will gradually reach a point of saturation. Hence, the relationship between future consumption and income can generally be more adequately interpreted by a logarithmic-inverse function than by a double-logarithmic function. The expected increase in the volume of food consumption per capita (quantities consumed weighted at constant prices) can be expected to be caused primarily by the growing demand for the more expensive commodities of low caloric content, whereas the consumption of high-caloric cheap commodities will tend to decrease.

90/ Particularly, the consumption of products favored by consumption shifts in recent years (such as citrus fruit, other fresh fruit, eggs, cream, and cheese) would be overstated. On the basis of the time-series elasticity, for example, per capita consumption of citrus fruit in 1975 would amount to 70 kilograms (double-log consumption function) or to 47 kilograms (log-inverse function). This is in contrast to the present level of only 32 kilograms in Spain, the country with the highest per capita consumption of citrus fruit in Europe.

91/ According to the projections, population increments will be due to increases in children and aged persons. The proportion of children under 15 will probably rise from 21 percent in 1959 to 22 in 1965 and to 23 percent in 1975. The proportion of people over 65 years of age is expected to rise from 12 percent in 1959 to 13 percent in 1965 and to 15 percent in 1975.

92/ In European countries with higher incomes (such as Switzerland, German Federal Republic, The Netherlands), the caloric intake is not much above the Austrian level.

On the basis of this selection, the final projections of per capita quantities consumed were those arrived at in table 128 (figure 33). According to these projections, the consumption of bread grain products per capita (in terms of flour equivalent) is expected to decline from 104 kilograms in 1959-60 to about 101 kilograms in 1965 (a decline of 3 percent) and to 99 kilograms in 1975 (a decline of 5 percent). At the same time, the proportion of wheat flour in total flour consumption is expected to rise from 65 percent to approximately 66 percent ("informed guess"). This line of development has been clearly indicated by family budget data of manual and clerical workers in recent years.

According to the family budget surveys carried out by the Chamber of Labor of Lower Austria, the consumption of bread grain products (in terms of flour) per food consumer unit declined from 1955 to 1959 by 9 percent; consumption of wheat flour decreased by 8 percent; that of rye flour by 11 percent. On the average of all family budget surveys carried out by the regional Chamber of Labor (published in "Statistisches Handbuch"), similar trends are recognized. It did not show up as clearly, however, in the food balances because the statistical ascertainment of total consumption apparently was rather inaccurate. (The estimates of Type I to VI for wheat and rye flour together yielded increases by 1965 of 0.05 to 0.4 percent, and by 1975 of 0.02 to 1.3 percent.) The consumption of cereal preparations (estimates of Type V) is expected to show a slight decrease from 5.1 kilograms in 1959-60 to 5.0 kilograms in 1965 and to 4.8 kilograms in 1975.

Table 128. - Average per capita consumption of food and tobacco products in 1965 and 1975, Austria

Commodity	Quantity				Index (1959-60=100)	
	Unit	1959-60	1965	1975	1965	1975
Wheat flour 1/	kg.	67.4	66.2	65.4	98.2	97.0
Rye flour 1/	kg.	36.6	34.8	33.6	95.1	91.8
Cereals	kg.	5.1	5.0	4.8	98.0	94.1
Edible oils 2/	kg.	9.4	9.8	10.2	104.3	108.5
Lard and tallow	kg.	4.9	4.5	4.1	91.8	83.7
Beef	kg.	13.9	15.3	17.8	110.1	128.1
Veal	kg.	2.8	3.2	3.6	114.3	128.6
Pork	kg.	31.3	32.9	36.3	105.1	116.0
Poultry	kg.	2.8	3.3	4.1	117.9	146.4
Other meat	kg.	3.1	3.0	3.0	96.8	96.8
Total meat	kg.	53.9	57.7	64.8	107.1	120.2
Eggs	No.	206.3	216.6	231.1	105.0	112.0
Whole milk	kg.	161.8	163.6	166.3	101.1	102.8
Cream	kg.	1.8	2.0	2.2	111.1	122.2
Cheese	kg.	2.8	3.2	3.9	114.3	139.3
Cottage cheese	kg.	1.6	1.6	1.5	100.0	93.8
Butter	kg.	4.3	4.8	5.7	111.6	132.6
Sugar	kg.	33.9	35.1	36.7	103.5	108.3
Potatoes	kg.	87.7	85.0	80.0	96.9	91.2
Vegetables	kg.	65.8	69.6	74.9	105.8	113.8
Fruit	kg.	56.3	61.7	69.9	109.6	124.2
Citrus fruit	kg.	12.5	14.9	18.7	119.2	149.6
Total food, per day	Calorie	2,949	2,981	3,064	101.1	103.9
at average prices of 1952-53/1956-57	AS	4,180	4,369	4,702	104.5	112.5
Total tobacco					1960=100	
products	Gram	3/1,518	1,589	1,709	104.7	112.6
at 1951 prices	AS	337	360	400	106.8	118.7
Cigarettes	No.	1,334	1,438	1,619	107.8	121.4

1/ All bread grain products are converted into flour equivalent on the basis of their raw material content.

2/ Including margarine, compound lard, coconut fat, etc. converted into oil equivalent

3/ 1960.

The per capita consumption of potatoes is also expected to decline somewhat; it will amount to approximately 85 kilograms 93/ in 1965 and about 80 kilograms in 1975, a decline of 3 and 9 percent, respectively, over 1959-60 94/. On the basis of the time-series elasticities, potato consumption should decrease by 4 to 5 percent by 1965, and 10 to 12 percent by 1975 (estimates of Type I and II). The time-series of potato consumption, however, are not very reliable, as has already been mentioned. The cross-section analyses yielded positive income elasticities for urban as well as for farm households. Although the family budget surveys of the Chambers of Labor fail to indicate a uniform trend over the past years, the general tendency is downwards.

The per capita consumption of vegetable fats (including marine oils) is expected to rise from 9.4 kilograms to 9.8 kilograms and 10.2 kilograms (estimates of Type V), i.e., 4 percent by 1965 and 8 percent by 1975. The preference of vegetable fats over animal fats will continue to be strong. On the basis of development in the past years it was assumed that the demand for lard and tallow will decrease by about the same amount as the consumption of vegetable fats is expected to grow. This would correspond to a decrease of the consumption of lard and tallow from 4.9 kilograms in 1959-60 to 4.5 kilograms in 1965 and 4.1 kilograms in 1975 95/. The proportion in total fat consumption will decline from 34 percent in 1959-60 to about 32 percent in 1965, and 29 percent in 1975.

The per capita consumption of meat is expected to increase from 53.9 kilograms in 1959-60 to 57.7 kilograms in 1965 (a rise of 7 percent) and to 64.8 kilograms in 1975 (a rise of 20 percent). The demand for beef, veal, and poultry will increase at a faster rate than that for pork; the consumption of other kinds of meat (mutton, lamb, horse, goat, game) is likely to decrease. In 1965 and 1975 the proportion of beef in total meat consumption is expected to amount to 27 and 28 percent (1959-60: 26 percent), and that of veal and poultry to 11 percent and 12 percent (1959-60:10 percent). The share of pork, on the other hand, is expected to drop from 58 percent to 57 and 56 percent in the target years, respectively. The projected changes in the pattern of meat consumption are valid only under the assumption of constant relative prices. If the price of veal should rise, less veal and more poultry will be consumed. The demand for both kinds of meat together, however, is likely to increase 16 percent by 1965 and 38 percent by 1975.

For other food commodities, the following is expected to be consumed in much larger quantities in 1965 and 1975 than in 1959-60: cream (up 11 and 22 percent respectively), butter (up 12 and 33 percent), cheese (up 14 and 39 percent), fresh fruit (up 10 and 24 percent), and first of all, citrus fruit (a rise of 19 and 50 percent). The per capita consumption of eggs is expected to increase 5 percent until 1965 (from 206 to 217 eggs), and by 12 percent until 1975 (231 eggs). The per capita vegetable consumption is expected to

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93/ Extrapolation of the per capita figure of 87.7 kilograms for 1959-60 as indicated in the food balances. Apparently, this figure is too high. According to the consumption surveys, on the average 69 kilograms of potatoes were consumed in urban households (1954-55), and 68 kilograms in farm households (1959). Average consumption of potatoes in the households covered by the Chamber of Labor survey in 1959, however, amounted to only some 63 kilograms per food consumer unit.

94/ "Independent" estimate.

95/ Based on "independent" estimates. According to the estimate of Type V, the per capita consumption would remain at approximately the present level.

rise by 6 percent (from 66 kilograms to 70 kilograms) until 1965, and by 14 percent (to 75 kilograms) until 1975. The consumption of fresh whole milk per capita on the other hand, is expected to grow only slightly (a rise of 1 and in the two periods 3 percent); cottage cheese is expected to be consumed in slightly less amounts after 1965 (a decline of 6 percent). All figures are based on Type VI estimates.

In 1965, the volume of total food consumption per capita (quantities at constant prices) is expected to be about 5 percent higher than in 1959-60; in 1975 it is expected to be about 13 percent higher than in the reference period. Calorie intake per capita, however, will increase only 1 percent and 4 percent, respectively; i.e., from 2,950 calories (including 5 percent for commodities not covered by the Food Balances) in 1959-60 to about 2,980 calories by 1965, and approximately 3,065 calories by 1975. In the future, food consumption will develop at a much smaller rate than it did during the fifties. By 1975 the annual growth of food demand may amount to only 0.8 percent and that of per capita energy intake to not more than about 1/4 percent per annum, as compared to 3.1 percent and 1.6 percent, respectively, during the period from 1950-51 to 1959-60.

The consumption of tobacco products per capita (estimates of Type V) is expected to rise (by weight) from 1,518 grams in 1960 to 1,589 grams in 1965 (a rise of 5 percent) and to 1,709 grams in 1975 (a rise of 13 percent). The increase in volume (consumption at constant prices) will amount to 7 and 19 percent. The per capita consumption is expected to be about 1,438 cigarettes by 1965, and 1,619 cigarettes by 1975, which corresponds to an increase of 8 percent and 21 percent over 1960 (1,334 units). There will be a general preference for filter cigarettes. Their share in total sales has increased from about 17 percent in 1960 to about 20 percent in the first half of 1961. In the German Federal Republic and in Switzerland, the proportion of filter cigarettes had already in 1959 risen to 63 percent and 70 percent respectively.

The level of income which may be achieved in Austria in the target years had already been reached by various European countries in 1959. A comparison of projected Austrian per capita demand for important food commodities with the actual consumption figures of these commodities in countries with similar climatic conditions will give some important criteria for assessing the reliability of the estimates. Table 129 presents the results of such a comparison with the Netherlands, German Federal Republic, Belgium, and Switzerland. In 1965, the level of per capita national income in Austria is expected to be approximately equal to that of the Netherlands or of the German Federal Republic in 1959. Because of the lack of reliable purchasing power parities, the national currencies have been converted on the basis of the official exchange rates. According to projections, the per capita calorie intake of the Austrian population in 1965 will be about equal to that of the Netherlands and somewhat higher than the level of the German Federal Republic in 1959-60. Per capita consumption of meat (especially pork), vegetables, fruit, bread grains, and cereals will be higher in Austria than in the other countries. However the consumption of fat, eggs, cheese, potatoes, and citrus fruit will be less than in other countries. Consumption of citrus and other fresh fruit combined will probably be higher. Estimated milk consumption per capita corresponds approximately to that of the Netherlands, but will be higher than in the German Federal Republic. In 1975 Austrian per capita national income will be equal to that of Belgium in 1959, but will still be somewhat below the level of Switzerland in 1959. The calorie intake is expected to be somewhat higher in Austria in 1965 and 1975 than it was in other countries in 1959-60 (table 129).

Table 129. – Projections of future per capita food consumption for Austria with comparisons for 1959-60 for the Netherlands, Belgium, Switzerland, and the German Federal Republic

Commodity	Austria		Comparison for 1959-60 1/:			
	1965	1975	Netherlands	German Federal Republic	Belgium	Switzerland
	Kilograms					
Bread grains 2/	101.0	99.0	80.8	80.3	86.6	74.5
of which wheat 2/	66.2	65.4	74.1	57.0	84.0	66.8
Cereals	5.0	4.8	3.1	3.4	2.2	4.7
Fats and oils 3/	18.3	19.1	24.9	25.3	21.7	19.7
of which butter	4.0	4.8	3.3	6.4	8.2	5.5
edible oils 4/	9.8	10.2	5/ 21.6	13.0	13.5	11.9
slaughter fats 3/	4.5	4.1		5.9		5/2.3
Meat	57.7	64.8	44.2	54.5	59.0	54.4
of which beef and veal	18.5	21.4	16.8	18.2	22.3	21.5
pork	32.9	36.3	19.8	28.7	24.6	23.1
poultry	3.3	4.1	6/ 1.6	3.8	6/ 5.1	3.5
Eggs, number	216.6	231.1	221.4	237.6	273.6	183.6
Whole milk	163.6	166.3	164.6	115.2	97.8	187.0
Cream	2.0	2.2	1.3		0.7	2.5
Cheese and cottage cheese	4.8	5.4	7.5	6.8	5.6	8.1
Sugar	35.1	36.7	43.9	28.1	33.1	41.8
Potatoes	85.0	80.0	90.0	7/ 140.0	143.0	73.0
Vegetables	69.6	74.9	62.3	8/ 40.1	67.6	75.7
Fruit	61.7	69.9	37.0	8/ 47.8	30.6	72.5
Citrus fruit	14.9	18.7	18.2	20.0	19.1	14.6
Calories per day	2,981	3,064	2,970	2,890	2,930	2,980

1/ Source of per capita consumption was OECD "Food Consumption in the OECD Countries," Paris, November 1960, preliminary figures.
2/ Flour equivalent.
3/ Pork fat content.
4/ Including margarine, compound lard, coconut fat, etc., converted into oil equivalent.
5/ Including other fats and fatty acids.
6/ Including rabbits and game.
7/ Including dried potatoes and potato starch flour.
8/ Excluding imports of canned products.

In addition to the higher consumption of bread grains and cereals, the demand for meat will be about 10 to 19 percent higher (mainly pork). However, in the rest of the countries, more fish is consumed. The consumption of milk, cream, sugar, vegetables, and fruit will be higher than in Belgium, and more eggs and potatoes will be consumed than in Switzerland. Under the assumption that the pattern and volume of per capita consumption in countries with a higher living standard is a useful indicator of future domestic demand, per capita consumption of meat, vegetables, and fruit (including citrus fruit) hardly seems to be capable of any increase beyond the projected levels. The per capita consumption of butter, cheese, and eggs, on the other hand, could rise further. The projections for bread grain products and cereal preparations rank very high, although (partly in contradiction to the results of the regression analyses) a declining tendency of consumption was assumed. The high level of consumption of flour products per capita, however, can be explained by specific Austrian consuming habits (e. g., macaroni, noodles, and dumplings with meat; high consumption of sweet pastries) and this is not likely to drop in the forseeable future to the level of other countries.

The methodology of projecting future demand was also applied to the projections of consumption expenditure on food and tobacco commodities per capita. As in the case of quantities consumed, the results were several alternative estimates for each commodity based on the use of logarithmic consumption function versus the logarithmic-inverse function, but making use in the expenditure case of only expenditure elasticities derived from the cross-section analyses for food. The future per capita expenditure on tobacco products was projected on the basis of time-series elasticities (including and excluding black-market purchases). The alternative estimates obtained for individual commodities did not differ very much for 1965. The difference between the lowest and highest values projected for a commodity varied from 0.1 percent (brown bread, lard and backfat, margarine, cottage cheese) to 5 percent (bacon and smoked ham, cream). The deviations among the alternative estimates for 1975 were generally higher because the difference between the results obtained by using double-log or log-inverse consumption functions are such as to increase with larger income changes. The lowest alternative estimates for a commodity for this target year were between 0.2 percent (brown bread) and 17 percent (bacon and smoked ham) below the corresponding highest estimates. For the final projections of expenditure per capita on food and tobacco, there is evidence that the relationship between future expenditure and income can best be interpreted within the framework of the double-logarithmic consumption function. Consumers are continuing to improve the qualitative composition of food intake, and there is a continuous shifting of demand in favor of high-quality (but low-caloric) products. It is not surprising, therefore, that the volume of per capita consumption (quantities weighted at constant prices) has increased at a much higher rate (on the average of 3. 1 percent per annum) than consumption in terms of calories (1. 6 percent). This trend is expected to continue until 1975 but possibly at a reduced rate since for most products there are relatively narrow limits to a further quantitative increase. According to the estimates selected for the final projections, per capita consumption in terms of calories is expected to increase at the rate of 0. 25 percent per annum while the volume of per capita food consumption grows at the rate of 0. 8 percent per annum. The demand for processing and distributive services included in the various food commodities, on the other hand, seems to be capable of further substantial increases.

According to a rough estimate, at present about 40 percent of consumption expenditure is for processors' and distributors' costs. The corresponding share in the United States amounts to 60 percent. Although the consumer habits of other countries (especially of the United States) cannot be regarded as typical for Austria, pre-cooked and ready-to-serve

Table 130. – Alternative projections of expected future demand in terms of per capita expenditure on food and tobacco, by commodities, 1965 and 1975, Austria 1/
(1959/60 = 100)

Commodity	Estimates for 1965 2/				Estimates for 1975 2/			
	I	II	III	IV	I	II	III	IV
Bread grain products	102.0	102.1	101.9	102.0	105.7	106.0	104.4	104.6
of which white bread	104.8		104.8		113.5		110.9	
brown bread	99.4		99.5		98.5		98.7	
wheat flour	98.9	99.5	99.0	99.5	97.3	98.7	97.7	98.8
macaroni, etc.	107.2		106.7		118.5		115.2	
Cereal preparations	107.4		106.6		124.6		117.5	
Meat and meat preparations	110.5	112.1	109.5	110.9	131.7	137.1	123.8	127.6
of which beef	111.2	112.5	110.3	111.5	131.0	135.5	125.0	127.7
pork	104.9	105.3	104.3	104.7	114.2	115.6	110.2	111.3
veal	115.1		113.8		143.4		133.7	
poultry	127.0		124.2		195.4		167.6	
smoked meat and ham	107.7	112.4	106.8	111.1	125.2	143.0	118.1	130.5
sausages	114.9	117.1	113.5	115.6	143.5	151.1	133.2	138.6
canned meat	109.6		108.4		129.9		121.0	
Lard and backfat	101.3		101.2		103.4		102.6	
Vegetable fats	104.8		104.4		112.3		110.0	
of which margarine	102.6		102.5		106.1		105.2	
cooking oils	105.7		105.2		114.8		112.0	
Fresh whole milk	100.2	102.0	100.1	101.7	100.8	105.9	100.3	104.2
Cream	114.9	119.1	113.3	117.2	150.9	161.5	136.7	145.0
Cheese	117.8		116.1		154.8		140.5	
Cottage cheese	100.6		100.5		101.4		101.3	
Butter	115.0		113.5		145.8		133.8	
Eggs	105.9		105.4		116.6		112.7	
Vegetables (fresh and frozen)	108.6	110.9	107.9	110.1	123.0	130.4	118.4	123.9
Potatoes	105.5		105.1		114.1		111.6	

Table 130. —Alternative projections of expected future demand in terms of per capita expenditure on food and tobacco, by commodities, 1965 and 1975, Austria 1/
(1959/60 = 100) – Continued

Commodity	Estimates for 1965 2/				Estimates for 1975 2/			
	I	II	III	IV	I	II	III	IV
Southern fruit	121.8		119.8		167.8		150.6	
Other fresh fruit	113.3	112.1	112.0	111.0	138.8	135.1	129.6	126.8
Sugar	102.5		102.3		106.7		105.2	
Marmalade and jam	116.9		115.2		153.6		139.4	
Sugar preparations	121.5		119.5		167.7		150.1	
Chocolate products	136.1		132.4		227.3		190.2	
Pastries	129.7		126.8		198.3		171.6	
Meals outside the home	129.6		126.7		198.6		171.3	
Total food	109.8	111.4	109.0	110.3	128.3	133.3	121.6	125.3
	1960 = 100							
Total tobacco products	107.6	106.7	106.9	106.1	124.7	121.6	118.9	116.6
of which cigarettes	109.0	107.9	108.3	107.3	129.8	125.9	122.7	119.9

1/ Projections derived according to formulas in Table 126.

2/ Alternative projections of food consumption designated as to type as follows: Type I (composite cross-section elasticity with urban coefficient unadjusted for household size and double-log consumption function), Type II (composite cross-section elasticity with urban coefficient adjusted for household size and double-log consumption function), Type III (composite cross-section elasticity with urban coefficient unadjusted for household size and log-inverse consumption function), Type IV (composite cross-section elasticity with urban coefficient adjusted for household size and log-inverse consumption function). Alternative projections of tobacco consumption designated as to type as follows: Type I (time-series elasticity, excluding black market purchases, and double-log function), Type II (time-series elasticity, including black market purchases, and double-log function), Type III (time-series elasticity, excluding black market purchases, and log-inverse function), Type IV (time-series elasticity, including black market purchases, and log-inverse consumption function).

commodities appear to be finding an expanded market also in this country. The expected changes in the structure of the population and in consumption patterns will cause the share of services in total food expenditure to increase. Concerning the structure of the population, the consumption of home-made foodstuffs is expected to further decrease due to the growing dependence of rural households on the market and a decrease in the agricultural population. For some years, bread has not been baked in farm households. This is not only to save labor, but also to benefit from the subsidy on bread grain marketed. For the same reason less butter is produced in the household. It is increasingly bought from dairies or substituted by margarine. Also, in the future other food commodities (especially meat and meat products) will increasingly be bought by the agricultural population on the market. The growing number of self-service food stores will stimulate progress in hygienical packing. The increasing number of deep-freezing chains (which bring deep-frozen product adds also to small shops and remote villages) will raise the consumption of deep-frozen foods. Concerning consumption patterns, the increasing number of employed women will cause an increasing demand for the so-called "built-in maid services" (i.e., precooked and hygienically packaged vegetables, frozen and canned products, instant cake mixes and doughs, ready-to-serve cakes and pastries, jams, canned fruit) provided these services are offered in sufficient quality and at reasonable prices. Up to the present time, the products offered (especially canned meats) have not met the tastes of consumers.

Increased advertising has caused a rising demand for dietary products (special kinds of bread and other grain products, dried fruit, nonalcoholic fruit juices, jams prepared of raw fruit, wheat germ oil, etc.), and new food products for infants. Demand for special cereals will rise with the increasing number of children. The number of meals taken in restaurants will also increase due to the larger number of employed women and the increasing tourist traffic. The shifts in demand in favor of better qualities will continue or even become stronger. The preference for fried or grilled meat will increase the sales of high-quality meat. Finally, the increasing demand for relatively expensive filter-tip cigarettes will cause a rather sharp rise in the expenditure on tobacco products.

For all these reasons, the calculated increases of per capita food expenditure do not seem to be too high. The projections (which are presented in detail in table 130) call for total real per capita expenditure on food to be about 11 percent higher by 1965 than in 1959-60 and 33 percent higher by 1975 than in the reference period (estimate of Type II). The calculation on the basis of time-series elasticities yielded increases between 11 and 13 percent for 1965, and between 28 and 37 percent for 1975, depending on the type of consumption function used. Above average increases in per capita expenditure are to be expected for chocolate products (an increase of about 36 percent by 1965 and 127 percent by 1975), meals taken outside the home (up 20 and 99 percent in the target years), pastries (30 and 98 percent), sugar products (22 and 68 percent), citrus fruit (22 and 68 percent), cream (19 and 62 percent), cheese (18 and 55 percent), sausages (17 and 51 percent), butter (15 and 46 percent), bacon and smoked ham (12 and 43 percent), jam (17 and 54 percent), and beef (13 and 36 percent). Per capita expenditure on brown bread and wheat is expected to be smaller in both target years than in 1959-60. Per capita expenditure on tobacco products is projected to be 8 percent higher by 1965 than in 1960 and 25 percent higher by 1975 than in the reference period. According to the projections of food expenditure, the future per capita expenditure on food will grow at the rate of at least 1.87 percent per annum by 1975 as compared to 3.76 percent per annum in the fifties.

Regarding the demand for food evaluated at farm prices, the projections for 1965 and 1975 indicate a small rise (table 131). If the per capita quantities of foodstuffs expected to be consumed in the target years are reduced to their contents of agricultural raw products and valued at farm prices, the Austrian population will consume 5 percent more agricultural raw products in 1965 than in 1959-60 and will consume 14 percent more in 1975 than in the reference period.

If only those products produced by domestic agriculture are included, the increases in the demand for agricultural raw products will amount to about 4.5 percent by 1965 and 13 percent by 1975 96/. The growth rate of the demand for agricultural raw products is expected to average 0.83 percent per annum by 1975 compared with 2.96 percent per annum for the period from 1950-51 to 1959-60. When products are excluded which cannot be domestically produced, the growth rate of demand is expected to be 0.77 percent per annum compared with 2.68 percent for 1950-51 to 1959-60. This means that the growth rate of the demand for agricultural raw products, compared with the fifties, will show a stronger decline (to less than one-third) than will be true of the growth rate of per capita food expenditure (which will drop to about one-half). (figure 34) The share of expenditure spent for processing and distributive services is expected to rise from about 39 percent in 1959-60 to 42 percent in 1965 and 48 percent in 1975. It will then still be considerably lower than the present marketing share in the United States.

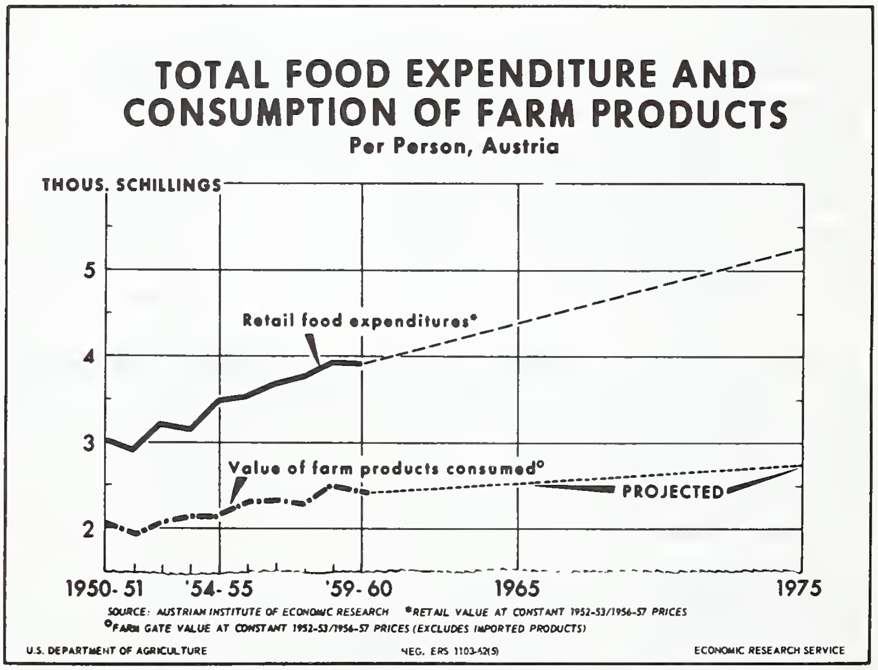

Figure 34

96/ Somewhat higher values are obtained if the future consumption of the demand for food evaluated at the farm gate is calculated on the basis of farm-level elasticities. The elasticity coefficient of food consumption evaluated at the farm gate was estimated earlier in the present chapter at 0.36 on the basis of the Urban Consumption Survey and at 0.42 on

Table 131. – Per capita food consumption expenditure, with breakdowns into consumption of agricultural primary products and consumption of services of the processing and distribution sector, 1959-60, and projections for 1965 and 1975, Austria

Item	Evaluated at prices of 1952-53/1956-59				
	1959-60 (Schillings)	1965 (Schillings)	1975 (Schillings)	Index (1959-60=100)	
				1965	1975
Food expenditure valued at retail	3,923	4,369	5,230	111.4	133.3
Food consumption (in terms of agricultural primary products) valued at farm gate:					
Based on all commodities	2,511	2,637	2,855	105.0	113.7
Based on domestically produced commodities 1/	2,405	2,516	2,710	104.6	112.7
Food consumption in terms of services of the processing and distribution sectors: 2/					
Based on all commodities	1,412	1,732	2,375	122.7	168.2
Including primary material equivalent of imported commodities	1,518	1,853	2,520	122.1	166.0

1/ Excluding entirely imported products (citrus fruit, rice, salt-water fish).
2/ Calculated as the difference between food expenditure and the consumption of agricultural primary products.

96/Continued

the basis of time-series data. From the cross-section elasticity coefficient, the increases in demand for food evaluated at the farm gate until 1965 would amount to 7 percent over 1959-60 if either the double-log or the log-inverse consumption function were used to make the projection, and until 1975 this demand would amount to 21 percent with a double-log function and to 16 percent with a log-inverse. The corresponding increases, if based on time-series elasticity coefficient, would amount to 9 percent (double-log function) and 8 percent (log-inverse function) for 1965 and 25 percent (double-log function) and 19 percent (log-inverse) for 1975. However, the time-series elasticity is confounded by strong dynamic elements (as has been extensively discussed) and cannot, therefore, directly be used for projections. The calculations derived from the cross-section elasticity using a log-inverse consumption function are only a little above the values indicated above. The main reasons for the differences are modifications of the estimates for certain products (i.e., flour, potatoes, lard). These *ex post* adjustments were made on the basis of various considerations.

Table 132. – Total quantities of food and tobacco consumed, by commodities and calories, 1959/60, and projections for 1965 and 1975, Austria

Commodity	Total consumption				
	1959/60 3/ (1,000 tons)	1965 (1,000 tons)	1975 (1,000 tons)	Index (1959/60=100) 1965	Index (1959/60=100) 1975
Wheat flour 1/	476.0	478.3	488.1	100.5	102.5
Rye flour 1/	259.0	251.4	250.8	97.1	96.8
Cereals	36.0	36.1	35.8	100.3	99.4
Edible oils 2/	66.5	70.8	76.1	106.5	114.4
Lard and tallow	34.5	32.5	30.6	94.2	88.7
Beef	98.0	110.5	132.8	112.8	135.5
Veal	20.0	23.1	26.9	115.5	134.5
Pork	221.0	237.7	270.9	107.6	122.6
Poultry	19.5	23.8	30.6	122.1	156.9
Other meat	22.5	21.7	22.4	96.4	99.6
Total meat	381.0	416.8	483.6	109.4	126.9
Eggs, number	5/ 1,458.0	5/ 1,565.0	5/ 1,724.8	107.3	118.3
Whole milk	1,143.0	1,182.1	1,241.1	103.4	108.6
Cream	12.5	14.5	16.4	116.0	131.2
Cheese	19.5	23.1	29.1	118.5	149.2
Cottage cheese	11.0	11.6	11.2	105.5	101.8
Butter	30.5	34.7	42.5	113.8	139.3
Sugar	239.5	253.6	273.9	105.9	114.4
Potatoes	620.0	614.2	597.1	99.1	96.3
Vegetables	465.0	502.9	559.0	108.2	120.2
Fruit	398.0	445.8	521.7	112.0	131.1
Citrus fruit	88.5	107.7	139.6	121.7	157.7
Total food					
Calories per day	6/20,838.7	6/ 21,538.9	6/22,867.6	103.4	109.7
As at average prices of 1952-53/1956-57	7/29,537.3	7/31,567.8	7/35,092.4	106.9	118.8
Total tobacco products grams	8/10,750.1	8/11,481.2	8/12,754.8	106.8	118.6
AS at prices of 1951	7/2,387.1	7/2,601.1	7/2,985.3	109.0	125.1
Cigarettes, number	5/9,451.3	5/ 10,390.1	5/12,083.1	109.9	127.8

Table 132.-Total quantities of food and tobacco consumed by commodities and calories, 1959/60, and projections for 1965 and 1975, Austria- Continued

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1/ All bread grain products are converted into flour equivalent on the basis of their raw material content.
2/ Including margarine, compound lard, coconut fat, etc., all converted into oil equivalent.
3/ The consumption figures of tobacco products refer to the calendar year of 1960.
4/ For tobacco products, 1960 = 100.
5/ Millions.
6/ Million calories.
7/ Million Austrian Schillings (AS).
8/ Tons.

3.3 Projecting the Total Demand of the Austrian Economy for Food and Tobacco

The future total consumption is projected in this section by multiplying per capita consumption projected for the future by the expected population figures. The total demand of the Austrian economy for food and tobacco is expressed alternatively as (i) calorie intake per day, (ii) as volume of consumption, (iii) total food expenditure, and (iv) total consumption of agricultural raw products. Total consumption of tobacco was projected only in terms of weight and volume of consumption.

Total food and tobacco consumption is presented in table 132, for quantities of individual commodities expected to be consumed, for the total daily calorie intake, and for the volume of total consumption. The total demand is expected to rise by a larger amount than per capita consumption since population is expected to increase 2 percent by 1965 and 6 percent by 1975, from 1959–60 levels. Consumption from 1959–60 to 1965 is expected to increase approximately 3 percent in terms of calorie intake or 7 percent in terms of volume of consumption. The expected increases will amount to 10 percent for calorie intake and 19 percent for volume by 1975. Total consumption of tobacco products will probably increase 7 percent in weight or 10 percent in volume by 1965. 19 percent in weight or 25 percent in volume by 1975.

Because of the expected population growth total food expenditure will rise 14 percent by 1965 and about 41 percent by 1975. From 1959/60 to 1965 and 1975 the total demand for agricultural raw products is expected to rise about 7 percent and 20 percent respectively.

IX. COMPOSITE EVALUATION OF SUPPLY, DEMAND, AND FOREIGN TRADE IN AGRICULTURAL PRODUCTS UNTIL 1975

This chapter summarizes the results of the preceding chapters, and puts them in their proper perspective. The first part contains a projection of the total volume of agricultural output; it is derived from the projections of crop and livestock production given in Chapters IV and V, and the projected development of the agricultural labor force discussed in Chapter III, part 1. In the following part, the projections of output of important agricultural commodities (Chapters IV and V) are compared with the projections of consumption (Chapters VI and VII, Part 3). Supply balances are developed and adjustment problems on certain agricultural markets are discussed. In the third part, general conclusions are drawn on the basis of balance sheets giving the degree of self-sufficiency for important products and foreign trade in agricultural products including the dependence of agricultural production on foreign trade.

1. Agricultural Production and Productivity

In order to get a complete view of the present and future productive forces of agriculture, the volume of agricultural output was computed on the basis of individual production data as previously outlined. To conform with internationally accepted definitions, output includes all products of plant and animal origin which are sold to trade and industry or consumed in farm households (final gross output of crop and livestock products). Intermediate products which re-enter the agricultural production process were excluded as well as sales transactions between domestic farms (e. g. , seed grain, feeds, draft and breeding animals), and storage losses were deducted. In the case of products which are used for human consumption as well as for livestock nutrition (bread grain, potatoes), the amount used for feeding was excluded.

The index calculation based on calendar years includes 14 branches of plant production and 8 branches of animal production, which represent 95 percent of total crop output and 98 percent of total livestock output. The crops harvested in the course of the year which do not enter other agricultural production processes, as well as the physical output of milk, meat, and eggs were weighted at average producer prices of 1952-56. Since agricultural statistics for the period of food rationing are unreliable and incomplete, the first detailed calculation of the volume of output was carried out for 1949, where the official data on commercial slaughterings were adjusted by raising slaughter figures 20 percent.

According to these computations, the index of plant production rose from 103 in 1950 (1934-38 = 100) to 135 in 1960, and the index of animal production from 92 to 126. The index of total agricultural output rose from 96 to 129. The average annual growth rates in the period from 1950 to 1960 amounted to 3.12 percent for plant production, 3.43 percent for livestock production, and 3.38 percent for total agricultural output. In order to eliminate the yearly random fluctuations of output, the average growth rates during the fifties were computed by the regression of production(productivity) on time using a semilog function (a similar method was employed for estimating the growth of food consumption); the growth rates for 1960-65 start from the actually observed values of 1960, the rates for 1957-65 are based on the 7-year moving average of 1957 (1954-60). It should be noted that the volume of production showed marked fluctuations in 1958, 1959, and 1960 in contrast to the preceding years when production grew at a steadier rate. The coincidence of good or of poor harvests of virtually all major crops in the same year is rather exceptional. In normal years, high yields of some products are in general compensated by medium or low yields of other crops.

According to the projections, in 1965 the volume of both plant and animal production, and consequently also of total agricultural output will be 43 percent higher than in 1934-38. The annual growth rates in the period from 1960 to 1965 will amount to 1.15 percent for plant, to 2.43 percent for animal, and 1.93 percent for total production. The rate of growth during 1960-65 will, therefore, be lower than during 1950-60. This is partly due to exceptionally good harvests in 1960 and the assumption of medium harvests in the target years. But even if the calculations are based on the smoothed values of a 1957 average (1954-60) the annual growth rate thus obtained for [the period of] 1957-65 of 2.64 percent is also lower than the growth rate of the fifties.

From 1965 until 1975, the growth rate of total agricultural production is assumed to slow down further. By 1975 plant production will be 60 percent, animal output 57 (Projection B) to 67 percent (Projection A), and total output 59 to 66 percent above the 1934-38 level. The corresponding annual growth rates from 1965 to 1975 amount to 1.15 percent for plant products, 0.97 to 1.62 percent for animal products, and 1.08 to 1.52 percent for total production (table 133). The growth rate of plant production estimated for 1965-75 is as high as for 1960-65 only because there was a record harvest in 1960, but medium harvests have been assumed for the target years. The estimated growth rate for 1957-65 is considerably higher.

In 1960, the volume of agricultural output was 29 percent above the level of 1934-38, although the agricultural area had been reduced by 10 percent and the volume of labor (labor units according to Chapter III, part 1) by 25 percent. The productivity of land was, therefore 43 percent higher and the productivity of labor 73 percent higher than in the interwar period. In 1951, land and labor productivity had only reached 95 percent of the prewar level. Labor productivity (output per labor unit) increased by 70 percent from 1951 to 1958. During the same period (1950-51 to 1957-58) the increase in the German Federal Republic amounted to 74 percent.

The average annual growth rate of labor productivity of 6.27 percent during 1951-60 was much higher than in all of the other sectors of the economy; it resulted from a growth rate of production of 3.69 percent and from an annual rate of employment reduction of 2.43 percent. No growth rates of land productivity have been estimated because the official statistics on agricultural areas from 1950 to 1960 are unreliable. For 1960, 1965, and 1975 agricultural areas have been estimated by the Institute on the basis of the forest census figures of 1952-56 table 134).

The agricultural area will probably be reduced to 89 percent of that in 1934-38 by 1965, and 87 percent by 1975. Since output will continue to increase, the productivity of land will amount to 161 (1934-38 = 100) in 1965, and in 1975 to a level between 183 (Projection B) and 191 (Projection A). The number of labor units in 1965 was estimated at 64 percent of the 1934-38 level, and will range from 53 to 56 percent in 1975. Thus the productivity of labor will rise 212 percent by 1965, and 283 to 310 percent by 1975. The annual rate of increase of labor productivity in the period 1957-65 will amount to 4.96 percent (1960-65: 4.13 percent). The growth rate for the period 1965-75 depending on which assumptions are taken for production and employment will be 2.94, 3.39, 3.44 or 3.90 percent.

2. Confrontation of Supply and Demand, and Implications for Foreign Trade

The production of agricultural commodities for the target years 1965 and 1975 was estimated on the basis of general economic and technological trends, independent of any development of demand. Only in the case of sugar and wheat, where measures directed towards limiting production are already in force, were the sales possibilities taken into consideration.

Although production estimates were developed independently of the demand side, they are nevertheless generally in line with consumption projections. The production of most agricultural commodities, except feedstuffs, is expected to grow at a faster rate than consumption, but the production increases either will reduce import requirements or will find foreign market outlets. A temporary excess of bread grain during exceptionally good harvests and a permanent surplus of meat are to be expected. Any temporary surplus stocks of bread grain can be stored for years of poor harvests, or used as animal feed. Presumably, exporting surplus production of slaughter animals and of meat will not encounter any major difficulties, assuming that Austrian agricultural exports into the European Common Market will not be discriminated against substantially. The surplus production of milk, which has caused serious problems of economic policy in recent years will probably disappear altogether.

2.1 Prospects for Bread Grain, Potatoes, and Sugar

In past years, the production of wheat and rye was not sufficient to meet the domestic demand for bread grain. Prior to 1938, about 350,000 metric tons had to be imported annually and in the early fifties, the volume of imports amounted to more than 500,000 metric tons. Due to the considerable expansion of wheat growing and to the growing production of quality wheat, import requirements in recent years have declined to about 250,000 metric tons annually. In 1960-61, the demand for bread grain imports amounted to only 150,000 metric tons, mainly hard wheat and rye. This was mainly because of a bumper wheat crop. The domestic supply of soft wheat actually exceeded demand. Some stocks were reduced in order that 38,000 metric tons of wheat could be exported and 50,000 metric tons sold to domestic agriculture for livestock feeding.

In the future, the domestic demand for rye and soft wheat is expected to be met fully, probably even in years of medium harvests. Since price incentives have induced a rising production of quality wheat, only small quantities of bread grain will be imported. The production of quality wheat rose from 40,000 metric tons in 1960 to about 100,000 metric tons in 1961, and is expected to increase even further. The projections of production and consumption result in the following estimates for the target years:

Table 133. - Volume of agricultural output for crops, livestock and total agricultural sector, 1934 to 1960, and projections for 1965 and 1975, Austria 1/

Year	Crop output		Livestock output		Total output	
	Billion AS	1934-38 = 100	Billion AS	1934-38 = 100	Billion AS	1934-38 = 100
1934-38	4.48	100	9.08	100	13.56	100
1949	4.24	95	6.44	71	10.68	79
1950	4.62	103	8.33	92	12.95	96
1951	4.25	95	7.83	86	12.08	89
1952	4.27	96	9.05	100	13.32	98
1953	4.62	103	9.15	101	13.77	102
1954	4.87	109	9.36	103	14.23	105
1955	5.13	115	9.67	106	14.80	109
1956	4.76	106	9.72	107	14.48	107
1957	5.05	113	10.46	115	15.51	114
1958	6.66	149	10.68	118	17.34	128
1959	4.89	109	10.91	120	15.80	117
1960	6.03	135	11.48	126	17.51	129
1965	6.40	143	12.98	143	19.38	143
1975 A	7.26	162	15.20	167	22.46	166
1975 B	7.26	162	14.26	157	21.52	159

1/ Calculated by the Institute at constant prices of 1952-56.

Table 134. — Indices of agricultural labor and land productivity and related data, 1934 to 1960, and projections for 1965 and 1975, Austria 1/

Year	Agricultural land area 2/	Labor units	Productivity of	
			Land	Labor
	1934-38 = 100			
1934-38	100	100	100	100
1949	96	–	82	–
1950	96	–	100	–
1951	94	94	95	95
1952	94	92	104	107
1953	94	89	109	114
1954	94	87	112	121
1955	94	85	116	129
1956	94	83	114	129
1957	94	81	121	142
1958	94	79	136	161
1959	93	77	126	151
1960	90	75	143	173
1965	89	64	161	212
1975 A	87	53 (56)	191	310 (295)
1975 B	87	53 (56)	183	297 (283)

1/ Calculated by the Institute; productivity equals output at constant prices of 1952-56 divided by agricultural land area or by the number of labor units, respectively.

2/ Up to 1959, area according to the Austrian Central Statistical Office; from 1960 on, estimates of the Institute.

Indigenous production of bread grain is expected to rise from 1.02 million metric tons in 1959-60 to 1.17 million metric tons (+ 15 percent) in 1965, and to 1.33 million metric tons (+ 31 percent) in 1975. The total demand for bread grain will remain at approximately the present level and will amount to 1.01 million metric tons in 1965, and 1.02 million metric tons in 1975. Consumption for other purposes (seed grain, storage losses, feed grain) will also increase slightly, because the quantity of grain for feed use will increase with rising harvests. Bread grain imports will decline to about 90,000 metric tons by 1965, and to about 33,000 metric tons by 1975. This will be exclusively composed of quality hard wheat for the production of certain kinds of farinaceous foods.

In years of above average crops, domestic production will exceed consumption. Since world market prices are generally low it will hardly be advantageous to export temporary surplus stocks. They probably will be used for feeding or stockpiling. Should the production of bread grain expand to a higher rate than was assumed in this study thereby creating permanent surplus stocks, supplies would have to be restricted (e. g. by a more rigorous quality control) and farmers induced by price adjustments to grow more feed grains, particularly barley, instead of wheat (table 135).

On the average, only one-fifth of the potato crop is used for human consumption, the rest going into livestock feeding except for small quantities reserved for seed and for industrial processing. The expected increase of potato production from an average of 3.50 million metric tons to 4.10 million metric tons in 1965 and 4.45 million metric tons in 1975 will thus mainly improve the livestock feed situation. The demand for human consumption in 1965 and 1975 has been estimated to be 1 and 3 percent respectively, lower than in 1959-60, and is expected to be met fully quantitatively and qualitatively by indigenous production. As was the case before the war, imports will be limited to about 20,000 metric tons of early potatoes from Italy and the Netherlands. During recent years, 40,000 metric tons were imported, but the extended production of early potatoes in the climatically favorable regions is expected to decrease this amount. Exports will probably be restricted to small quantities, about 10,000 metric tons, of seed potatoes and potatoes for human consumption to Italy (table 136).

In recent years, surplus stocks of sugar have accumulated as a result of both the expansion of sugarbeet areas and the increasing yields per hectare. As late as 1956-57 sugar had to be imported, but since then production has increased at a faster rate than consumption. In 1959-60, the production of sugar amounted to 265,000 metric tons while only 250,000 metric tons were consumed, increasing stocks by 15,500 metric tons. In the spring of 1961, there were 42,000 metric tons in reserves, and a surplus of 50,000 metric tons. By 1960, small residual quantities were imported to fulfill previous contracts.

Sugar can be exported only at heavily reduced prices. The production of sugarbeets is, therefore, restricted by quotas (see Chapter III, part 3) which are adjusted to domestic demand as nearly as possible. In the future, Austria's foreign trade in sugar is expected to be limited to negligible quantities.

Consumption of sugar was estimated to reach 254,000 metric tons in 1965, and 274,000 metric tons in 1975; there will be an additional demand of 12,000 metric tons and 15,000 metric tons in 1965 and 1975, respectively, for uses in bee farming and in making wine. The production of sugarbeets generally exceeds the quotas by a small margin because producers, anticipating lower yields due to unfavorable weather conditions, usually overplant sugarbeets. Projections of total sugarbeet production in 1965 and 1975 correspond to 292,000 metric tons and 319,000 metric tons of sugar (assuming an average content of 14.5 percent). Surplus beets will have to be used for feeding either directly or after processing as dried slices. When stocks are low, any available surplus beets can be processed for sugar and added to the stocks (table 137).

2.2 Prospects for Fresh Fruit and Vegetables

The volume of total fruit production fluctuates widely from year to year. For example, the extremely low harvest of 0.26 million metric tons in 1957 was followed by an unusually high crop of 1.46 million metric tons in 1958. The consumption of fresh fruit and of tropical varieties (excluding citrus fruit), however, remained comparatively stable and even with sizable price reductions, demand was only slightly influenced. Sales difficulties usually followed large harvests, especially for those fruits which are not suitable for storage. Because of the lack of sufficient processing facilities, only small quantities of

Table 135. – Supply-demand balance for bread grains, 1934-38/1960-61, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption other uses 1/	Total	Balance 2/	Distribution of balance			Change in stocks 4/
						Imports	Foreign trade exports	Balance 3/	
				1,000 metric tons					
1934-38	962	1,068	236	1,304	- 342	344	2	+ 342	–
1950/51	782	1,067	292	1,359	- 577	526	–	+ 526	- 51
1951/52	688	931	179	1,110	- 411	503	–	+ 503	+ 81
1952/53	749	985	149	1,134	- 385	399	7	+ 392	+ 7
1953/54	932	988	217	1,205	- 273	162	–	+ 162	-111
1954/55	833	992	232	1,224	- 391	344	–	+ 344	- 47
1955/56	977	1,022	293	1,315	- 338	355	–	+ 355	+ 17
1956/57	1,016	980	242	1,222	- 206	247	7	+ 240	+ 34
1957/58	985	988	259	1,247	- 262	246	–	+ 246	- 16
1958/59	958	1,006	222	1,228	- 270	241	–	+ 241	- 29
1959/60	1,017	1,018	267	1,285	- 268	340	5	+ 335	+ 67
1960/61 5/	1,069	971	252	1,223	- 154	152	38	+ 114	- 40
1965	1,173	1,011	252	1,263	- 90	90	–	+ 90	–
1975	1,331	1,022	342	1,364	- 33	33	–	+ 33	–

1/ Animal feed, seed, waste, and industrial use.
2/ Surplus (+) or deficit (-).
3/ Net exports (-) or net imports (+).
4/ Increase (+) or decrease (-) in stocks.
5/ Preliminary figures.

Table 136. – Supply-demand balance for potatoes, 1934-38/1959/60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Distribution of balance			Changes in stocks 4/
						Imports	Foreign trade exports	Balance 3/	
				1,000 metric tons					
1934-38	2,844	650	2,209	2,859	- 15	19	4	+ 15	–
1950/51	2,548	730	1,833	2,563	- 15	19	4	+ 15	–
1951/52	2,159	715	1,463	2,178	- 19	20	1	+ 19	–
1952/53	2,567	700	1,884	2,584	- 17	20	3	+ 17	–
1953/54	3,293	685	2,588	3,273	+ 20	18	38	- 20	–
1954/55	2,792	670	2,174	2,844	- 52	52	–	+ 52	–
1955/56	3,005	670	2,356	3,026	- 21	25	4	+ 21	–
1956/57	3,229	670	2,578	3,248	- 19	28	9	+ 19	–
1957/58	4,034	660	3,372	4,032	+ 2	21	23	- 2	–
1958/59	3,542	650	2,916	3,566	- 24	27	3	+ 24	–
1959/60	2,946	620	2,368	2,988	- 42	42.5	0.5	+ 42	–
1965	4,094	614	3,490	4,104	- 10	20	10	+ 10	–
1975	4,450	597	3,863	4,460	- 10	20	10	+ 10	–

1/ Animal feed, seed, waste, and industrial. 2/ Surplus (+) or deficit (-). 3/ Net exports (-) or net imports (+).
4/ Increase (+) or decrease (-) in stocks.

fruit were canned or processed for juices. Each year not only were large quantities of early fruit varieties and tropical fruit imported, but also apples and other species of fruit suitable for storing, especially after years of poor harvests.

Fruit production was projected to increase along with an improvement in quality. For 1965 and 1975, average harvests of 0.74 million metric tons and of 0.86 million metric tons were projected. (These figures refer to quantities actually harvested; fruit remaining on the trees is excluded). The consumption of fruit and southern fruit (excluding citrus fruit) for human use, on the other hand, has been estimated at 0.45 million metric tons in 1965, and at 0.52 million metric tons in 1975. The import demand for early fruit and southern fruit, however, will develop in part independently of domestic supply. Including a small amount for apples and pears, total imports in 1965 and 1975 may be estimated at 0.15 and 0.17 million metric tons respectively. Exports are likely to remain at their relatively low level and will be limited to special varieties, apricots, strawberries, and currants. The difference between production and human consumption is made up for the most part by fruit for cider production, and for industrial purposes. The utilization of these "economy varieties" will not encounter any major problems in years of regular harvests since the total demand for fruit juices is increasing as transportation facilities improve. As in the past, however, in years of bumper harvests it may not be possible to find market outlets for the entire crop. This will particularly hold true if in the course of European integration, highgrade fruit may be imported free of duty (table 138).

Imports of citrus fruit have increased continuously, corresponding to the rise in consumption (imported citrus fruit is exclusively used for direct human consumption), from 15,000 metric tons in 1950/51 to 88,500 metric tons in 1959/60 (490 percent), three times as high as before the war. Only in 1958-59 when domestic fruit production was extraordinarily abundant did citrus imports suffer a temporary setback. The strong increase began when imports were liberalized in 1954. On the basis of projected development of consumption, import demand was estimated at 108,000 metric tons in 1965, and 139,500 metric tons in 1975; this will be 22 percent and 58 percent more than in 1959/60 (table 139).

As with fruit, the import demand of vegetables is to some degree independent of domestic supply. Owing to the seasonal advantage the southern European countries and the Netherlands have, they can supply prime vegetables (the demand for which increases strongly with rising income) earlier than domestic producers. The volume of output is difficult to project because there are no production statistics available. In the future, sales difficulties will continue to arise after good harvests since supplies will then be too large for domestic market capacities and in addition, deliveries are limited to a very short period. An effective improvement of the marketing position could be achieved by a more extensive adoption of processing and packaging methods (frozen and canned vegetables). Some encouraging preliminary results on this line have already been reached (table 140).

2. 3 Prospects for Edible Oils

The demand for vegetable oils and marine oils has grown steadily from 39,000 metric tons in 1950-51 to 77,000 metric tons in 1959-60 (97 percent). Demand rose from 31,000

Table 137. – Supply-demand balance for sugar, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance		Change in stocks 4/
							Foreign trade exports	Balance 3/	
	1,000 metric tons								
1934-38	161	163	–	163	- 2	2	–	+ 2	–
1950/51	103	165.5	3	168.5	- 65.5	87.5	–	+ 87.5	+ 22
1951/52	143.5	185	4	189	- 45.5	52.5	–	+ 52.5	+ 7
1952/53	120	170	3.5	173.5	- 53.5	57.5	–	+ 57.5	+ 4
1953/54	161	178.5	4	182.5	- 21.5	53	0.5	+ 52.5	+ 31
1954/55	190	192.5	8.5	210	- 11	10.5	2	+ 8.5	- 2.5
1955/56	191.5	224.5	11	235.5	- 44	13	1	+ 12	- 32
1956/57	193	230.5	8	238.5	- 45.5	67.5	1	+ 66.5	+ 21
1957/58	255	239	14	253	+ 2	46	1	+ 45	+ 47
1958/59	266.5	241.5	14.5	256	+ 10.5	12	1.5	+ 10.5	+ 21
1959/60	265.5	239.5	10.5	250	+ 15.5	1.5	1.5	0	+ 15.5
1965	292	254	5/ 38	292	0	0	0	0	-
1975	319	274	6/ 45	319	0	0	0	0	-

1/ Animal feed, waste, and industrial use. 2/ Surplus (+) or deficit (-). 3/ Net exports (-) or net imports (+). 4/ Increase (+) or decrease (-) in stocks. 5/ Consumption by apiaries and for upgrading of wine (12,000 metric tons); the surplus (103,000 metric tons of sugarbeet) may be fed to animals (possibly as dried slices) or processed for sugar (15,000 metric tons) which quantity has to be put on stocks or exported. 6/ Consumption by apiaries and for upgrading of wine (15,000 metric tons); disposal of surplus as in 1965.

Table 138. – Supply-demand balance for fresh and southern fruit (excluding citrus fruit), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance		Change in stocks 4/
							Foreign trade exports	Balance 3/	
	1,000 metric tons								
1934-38	470	251	286	537	- 67	67	–	+ 67	–
1950/51	910	352	566	918	- 8	16	8	+ 8	–
1951/52	562	300	295	595	- 33	33	–	+ 33	–
1952/53	605	310	326	636	- 31	34	3	+ 31	–
1953/54	532	311	275	586	- 54	55	1	+ 54	–
1954/55	420	276	241	517	- 97	97	–	+ 97	–
1955/56	650	348	370	718	- 68	74	6	+ 88	–
1956/57	791	453	424	877	- 86	88	2	+ 86	–
1957/58	262	240	131	371	-109	110	1	+109	–
1958/59	1,458	696	837	1,533	- 75	76	1	+ 75	–
1959/60	403	398	157	555	-152	153	1	+152	–
1965	740	446	439	885	-145	150	5	+145	–
1975	860	522	501	1,023	-163	170	7	+163	–

1/ Animal feed, waste, and industrial use. 2/ Surplus (+) or deficit (-). 3/ Net exports (-) or net imports (+). 4/ Increase (+) or decrease (-) in stocks.

metric tons to 66,500 metric tons (115 percent) in this period due to the shift in fat consumption to vegetable oils, margarine, and coconut products. Between 7,000 metric tons (1951/52) and 12,500 metric tons (1957/58) were used annually in industry and for feeding. Since oil production from the domestic crop is relatively low (it varied between 3,500 and 5,000 metric tons in the last few years) the major part of oil requirements has to be imported. Apart from short-run fluctuations caused by inventory movements, imports rose continually from 29,000 metric tons in 1950-51 to 73,500 metric tons in 1959-60 (153 percent). These consisted mostly of various unrefined oils and hardened fats as well as oil seeds (included in total imports in terms of oil content). Since the various oil seeds can largely be substituted against each other, the composition of imports depends on the prevailing price relations. Only the import demand for hydrogenated oils is actually determined by the volume of margarine production.

The food demand for vegetable and marine oils has been estimated at 71,000 metric tons in 1965, and at 76, 000 metric tons in 1975. Consumption for other purposes is estimated at 13,000 metric tons in 1965, and 14,000 metric tons in 1975. Total demand in 1965 and 1975 will, therefore, be 9 percent and 17 percent higher than in 1959-60. Considering the present quota system and assuming medium harvests, domestic production of oil seeds and oil crops is projected at some 6,000 metric tons for 1965 and 1975. Therefore, total demand for imports will amount to 78,000 metric tons in 1965 and 84,000 metric tons in 1975, 6 percent and 15 percent respectively above the 1959-60 level (table 141).

2. 4 Prospects for Milk and Dairy Products

Milk production averaged during 1934-38 2.39 million metric tons annually. Total consumption of fresh milk and of dairy products amounted to 1.85 million metric tons (in terms of milk equivalent); an additional 0.41 million metric tons were used for feeding. This balance leaves a surplus of 133,000 metric tons which consists of exports of various kinds of dairy products (93,000 metric tons) and of "statistical adjustment." Statistical adjustments were necessary for computing the milk balance from 1934-38 to 1959-60, because exact factors for converting the various dairy products into milk are not available due to the great variety and the changing fat content. For lack of appropriate statistical material, constant average conversion factors had to be applied for the entire period.

During the early fifties, the milk supply and utilization was generally balanced. From 1956 onward, however, production increased faster than consumption. This was mainly because of a rise in producer prices from AS 1.60 to AS 1.90 per liter of 3.5 percent butterfat. The supply pressure was reduced slightly when AS 0.15 per liter were deducted from the producer price and allocated to the Crisis Fund (see Chapter IV part 3), resulting in a greater emphasis on beef production. The surplus milk was processed for butter and cheese and exported at prices a little below the domestic price level.

The sales prospects for milk by 1975 appear more favorable than in the past years. By 1965, milk production is expected to rise to 3.09 million metric tons and consumption to 2.44 million metric tons (milk equivalent). Since about 0.63 million metric tons will be used for feeding, a surplus of only 20,000 metric tons will result. If cheese imports do not exceed the level of recent years (40,000 to 50,000 metric tons of milk equivalent) Austria will have to export only the relatively small quantity of 60,000 metric tons as fresh milk or as dairy products.

Table 139. – Supply-demand balance for citrus fruit, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance: Foreign trade exports	Balance 2/	Change in stocks 3/
				1,000 metric tons					
1934-38	–	30	–	30	-30	30	–	+ 30	–
1950/51	–	15	–	15	-15	15	–	+ 15	–
1951/52	–	19	–	19	- 19	19	–	+ 19	–
1952/53	–	29	–	29	- 29	29	–	+ 29	–
1953/54	–	41	–	41	- 41	41	–	+ 41	–
1954/55	–	49	–	49	- 49	49	–	+ 49	–
1955/56	–	51.5	–	51.5	- 51.5	51.5	–	+ 51.5	–
1956/57	–	57	–	57	- 57	57	–	+ 57	–
1957/58	–	87	–	87	- 87	87	–	+ 87	–
1958/59	–	71	–	71	- 71	71	–	+ 71	–
1959/60	–	88.5	–	88.5	- 88.5	88.5	–	+ 88.5	–
1965	–	108	–	108	-108	108	–	+108	–
1975	–	139.5	–	139.5	-139.5	139.5	–	+139.5	–

1/ Surplus (+) or deficit (-).

2/ Net exports (-) or net imports (+).

3/ Increase (+) or decrease (-) in stocks.

Table 140. – Supply- demand balance for vegetables, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance: Foreign trade exports	Balance 3/	Change in stocks 4/
				1,000 metric tons					
1934-38	450	390	90	480	- 30	30	–	+ 30	–
1950/51	500	427	100	527	- 27	28	1	+ 27	–
1951/52	500	425	100	525	- 25	25	–	+ 25	–
1952/53	500	426	100	526	- 26	26	–	+ 26	–
1953/54	500	428	100	528	- 28	29	1	+ 28	–
1954/55	470	427	94	521	- 51	53	2	+ 51	–
1955/56	500	447	100	547	- 47	48	1	+ 47	–
1956/57	500	452	100	552	- 52	55	3	+ 52	–
1957/58	500	450	100	550	- 50	52	2	+ 50	–
1958/59	500	458	100	558	- 58	60	2	+ 58	–
1959/60	500	465	100	565	- 65	68	3	+ 65	–
1965	553	503	120	623	- 70	75	5	+ 70	–
1975	609	559	128	687	- 78	85	7	+ 7	–

1/ Animal feed, waste, and industrial use.

2/ Surplus (+) or deficit (-).

3/ Net exports (-) or net imports (+).

4/ Increase (+) or decrease (-) in stocks

Total milk production in 1975 is estimated at 3.6 million metric tons, with an export surplus of 160,000 metric tons. If production should amount to only 3.3 million metric tons, however, the import demand would be 180,000 metric tons (milk equivalent). The average of both projections for 1975 shows domestic milk supply and utilization near equilibrium. This development probably will occur because foreign demand for beef will remain strong and this is expected to induce producers to expand cattle fattening. The fact that Austrian cattle breeds have been developed for combined milk and meat performance will make this shift, already in process, easier (table 142).

2.5 Prospects for Meat and Eggs

The average total production of meat during 1934-38 (excluding slaughter fats) amounted to 276,000 metric tons per year. In order to meet the demand of 330,000 metric tons, imports of 54,000 metric tons were necessary. During the fifties, net imports decreased to a maximum of 21,000 metric tons; in 1953-54 and 1957-58, however, export surpluses were achieved. (Foreign trade in breeding and other nonslaughter animals is not included in the meat balance.)

By 1965, total meat production (excluding slaughter fats) may reach approximately 450,000 metric tons; by 1975, the estimates range from 500,000 to 530,000 metric tons. Meat consumption was projected at 411,000 metric tons in 1965 and 473,000 metric tons in 1975. Since the import of slaughter animals, meat and poultry will probably not fall below 20,000 metric tons (meat equivalent). Sizable export surpluses are expected which will amount to about 57,000 metric tons in 1965, and between 48,000 and 77,000 metric tons by 1975. These quantities probably can be exported without any major difficulties providing Austrian agricultural exports are not seriously discriminated against in their most important markets, Italy and Germany (table 143).

In the interwar period, the import demand for beef and veal amounted to about 12,000 metric tons annually. From 1950-51 to 1955-56, imports and exports of slaughtering cattle were virtually in balance. Since then exports have risen considerably and during the last 2 years reached 15,000 and 17,000 metric tons, respectively, while imports, with the exception of 1959-60 (8,000 metric tons), remained at a relatively low level (2,500 to 4,500 metric tons). Since calf-raising is being further intensified and the turnover of the cattle stock accelerated, by 1965 a total output of almost 170,000 metric tons of beef and veal can be expected. The supply of veal, however, will hardly exceed its present level of 30,000 metric tons. In 1975, the production of beef and veal is expected to range between 190,000 and 205,000 metric tons, which would be twice as much as in the prewar period. Considering the projected levels of consumption of 134,000 metric tons in 1965, and of 160,000 metric tons in 1975, a surplus of 33,000 metric tons (1965) and 32,000 to 46,000 metric tons (1975), is projected. If future beef imports are assumed to be 5,000 metric tons annually (there has been a marked tendency to import relatively cheap cattle for slaughter and to increase exports of cattle for breeding and other nonslaughter uses) the volume of gross exports in 1965 may be estimated at 38,000 metric tons, and by 1975 between 37,000 and 51,000 metric tons of beef. If these figures are converted into numbers on the basis of the average live weight in 1959, exports will amount to 140,000 (1965) and 150,000 to 185,000 (1975) head of slaughter cattle. In 1960, about 50,000 head were exported (table 144).

Table 141. – Supply-demand balance for edible oils (vegetable and fish oils), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance		Changes in stocks 4/
							Foreign trade exports	Balance 3/	
	1,000 metric tons								
1934-38	1	34.5	16	50.5	- 49.5	50	0.5	+ 49.5	–
1950/51	1.5	31	8	39	- 37.5	29	–	+ 29	+ 8.5
1951/52	1.5	34.5	7	41.5	- 40	42	–	+ 42	+ 2
1952/53	4	33	9.5	42.5	- 38.5	35	–	+ 35	- 3.5
1953/54	3.5	38	10	48	- 44.5	42	–	+ 42	- 2.5
1954/55	3	40.5	11.5	52	- 49	50.5	–	+ 50.5	+ 1.5
1955/56	5	47.5	11	58.5	- 53.5	56.5	–	+ 56.5	+ 3
1956/57	5	54	12	66	- 61	60.5	0.5	+ 60	- 1
1957/58	4.5	58.5	12.5	71	- 66.5	66.5	–	+ 66.5	–
1958/59	5	62.5	11.5	74	- 69	69	–	+ 69	–
1959/60	3.5	66.5	10.5	77	- 73.5	73.5	–	+ 73.5	–
1965	6	71	13	84	78	78	–	+ 78	–
1975	6	76	14	90	84	84	–	+ 84	–

1/ Waste and industrial use.
2/ Surplus (+) or deficit (-).
3/ Net exports (-) or net import (+).
4/ Increase (+) or decrease (-) in stocks.

Table 142. – Supply-demand balance for cow milk (cream, condensed milk, dried milk, butter, and cheese in terms of fluid milk equivalent), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance		Change in stocks 4/	Statistical adjustment
							Foreign trade exports	Balance 3/		
	1,000 metric tons									
1934-38	2,393	1,851.0	409.0	2,260.0	+133.0	8.0	93.0	-85.0	–	+ 48.0
1950/51	2,179	1,765.8	422.0	2,187.8	- 8.8	42.8	8.0	+ 34.8	–	+ 26.0
1951/52	2,173	1,752.0	422.0	2,174.0	- 0.1	31.7	–	+ 31.7	–	+ 30.7
1952/53	2,331	1,866.5	473.0	2,339.5	- 8.5	24.5	4.0	+ 20.5	–	+ 12.0
1953/54	2,497	1,962.5	475.0	2,437.5	+ 59.5	8.0	54.5	- 46.5	- 10.8	+ 23.8
1954/55	2,535	2,015.8	500.0	2,515.8	+ 19.2	42.6	49.0	- 6.4	–	+ 12.8
1955/56	2,559	2,200.5	526.2	2,726.7	-167.7	199.2	31.0	+168.2	–	- 0.5
1956/57	2,693	2,088.5	502.0	2,590.5	+102.5	79.4	137.2	- 57.8	+ 46.0	- 1.3
1957/58	2,756	2,058.2	488.8	2,547.0	+209.0	61.6	294.5	-232.9	+ 11.5	- 12.4
1958/59	2,761	2,047.5	507.4	2,554.9	+206.1	32.0	281.5	-249.5	- 11.5	- 31.9
1959/60	2,800	2,090.2	560.2	2,650.4	+149.6	45.6	190.2	-144.6	+ 15.1	- 10.1
1965	3,087	2,442	626	3,068	+ 19	45	64	- 19	–	–
1975 A	3,600	2,767	716	3,483	+117	45	162	-117	–	–
1975 B	3,300	2,767	713	3,480	-180	200	20	+180	–	–

1/ Animal feed and waste. 2/ Surplus (+) or deficit (-). 3/ Net exports (-) or net imports (+). 4/ Increase (+) or decrease (-) in stocks.

During 1934-38, about 83 percent of total pork consumption (190,000 metric tons) on the average was covered by indigenous production. A small export surplus developed in 1953/54 (1,500 metric tons), but in the late fifties, net imports of 14,000 to 19,000 metric tons were required. By 1965, the production of pork is projected to rise to about 255,000 metric tons (excluding lard), but consumption will only increase to 240,000 metric tons. Since at least 4,000 metric tons have to be imported to compensate for seasonal fluctuations of supply and for the production of special meat preparations, the exportable surplus of pork is estimated to reach about 19,000 metric tons. Assuming an average live weight of 109.8 kilograms (1959) and a carcass yield of 80 percent, this quantity corresponds to about 215,000 hogs. For 1975, production was estimated to reach about 280,000 to 295,000 metric tons of meat, and total consumption was projected at 271,000 metric tons. Import requirements were estimated at only 2,000 metric tons since it can be expected that the strong seasonal fluctuations of present market deliveries will level out. The exportable surplus of pork would then amount to between 11,000 and 26,000 metric tons, which corresponds to about 125,000 to 295,000 hogs (table 145).

Half the consumption of poultry meat had to be imported during 1934-38. Consumption in the past decade increased faster than production aided by the scarcity of veal. Also, the expense of veal caused consumers to shift to poultry which was relatively cheap. Even if domestic production of poultry should rise to 5 or 6 times the prewar level by 1965 and 1975 (19,000 and 24,000 metric tons), there will still be a need for imports of 5,000 and 7,000 metric tons in order to meet the expected demand of 24,000 metric tons in 1965 and 31,000 metric tons in 1975 (table 146).

The consumption of other kinds of meat, mutton, goat, and horse meat, has continuously declined. Total consumption is expected to fall to about 15,000 metric tons by 1965, and to 11,000 metric tons by 1975. Import requirements (mainly horses for slaughter) are projected at about 7,000 metric tons (1965) and 6,000 metric tons (1975) of meat equivalent.

The production of slaughter fats is obtained indirectly from slaughter numbers. The extraction of tallow was assumed to be 15 kilograms per head of cattle, and the quantity of backfat, etc., per hog processed for lard was estimated at 14 percent (1965) and 13 percent (1975) of average carcass weight. Raw fat was converted into lard by a conversion factor of 0.8. On the basis of the projected slaughterings of domestically raised hogs and cattle, the supplies of lard and tallow are estimated at 36,000 metric tons in 1965, and at 39,500 metric tons in 1975. About 1,000 metric tons (1965) and 500 metric tons (1975) will be extracted from imported slaughter animals. Domestic demand for food use was estimated at 32,500 metric tons (1965) and 30,500 metric tons (1975). The residual quantities, 4,500 metric tons in 1965, and 9,500 metric tons in 1975 will be used for industrial purposes (table 147).

Due to an increase in demand, egg imports increased sharply in recent years. In 1959-60, 12,500 metric tons were imported, compared with only about 2,000 metric tons in the midfifties and 5,000 in the prewar period. Although a substantial rise of domestic output is assumed for 1965 and 1975, 75,000 metric tons and 89,000 metric tons, respectively, as compared with the 40,000 metric tons average of 1934-38, the projected consumption of 87,000 metric tons in 1965, and of 96,000 metric tons in 1975 will require imports of 12,000 metric tons in 1965, and 7,000 metric tons in 1975 (table 148).

Table 143. – Supply-demand balance for all meat (excluding lard and tallow), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance		Change in stocks 3/
							Foreign trade exports	Balance 2/	
	1,000 metric tons								
1934-38	276	330	–	330	- 54	54	–	+ 54	–
1950/51	253	265	–	265	- 12	9.5	2.5	+ 7	- 5
1951/52	249.5	258	–	258	- 8.5	12	–	+ 12	+ 3.5
1952/53	291	295	–	295	- 4	3	0.5	+ 2.5	- 1.5
1953/54	317	305	–	305	+ 12	1	15	- 14	- 2
1954/55	305	320	–	320	- 15	16.5	4	+ 12.5	- 2.5
1955/56	322.5	332	–	332	- 9.5	14.5	4.5	+ 10	+ 0.5
1956/57	329	340	–	340	- 11	21.5	10	+ 11.5	+ 0.5
1957/58	350.5	346	–	346	+ 4.5	14.5	16	- 1.5	+ 3
1958/59	368.5	374.5	–	374.5	- 6	24	18	+ 6	–
1959/60	360.5	381	–	381	- 20.5	37	16	+ 21	+ 0.5
1965	447	411	–	411	+ 36	21	57	- 36	–
1975 A	530	473	–	473	+ 57	20	77	- 57	–
1975 B	501	473	–	473	+ 28	20	48	- 28	–

1/ Surplus (+) or deficit (-).

2/ Net exports (-) or net imports (+).

3/ Increase (+) or decrease (-) in stocks.

Table 144. – Supply-demand balance for beef and veal (excluding tallow), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance		Change in stocks 3/
							Foreign trade exports	Balance 2/	
	1,000 metric tons								
1934-38	95	107	–	107	- 12	12	–	+ 12	–
1950/51	94	97	–	97	- 3	1.5	2.5	- 1	- 4
1951/52	93	95.5	–	95.5	- 2.5	2.5	–	+ 2.5	–
1952/53	105.5	106	–	106	- 0.5	0.5	–	+ 0.5	–
1953/54	123.5	111.5	–	111.5	+ 12	–	12	- 12	–
1954/55	113	114.5	–	114.5	- 1.5	3	2.5	+ 0.5	- 1
1955/56	113	114	–	114	- 1	4.5	3.5	+ 1	–
1956/57	119	114.5	–	114.5	+ 4.5	4.5	9	- 4.5	–
1957/58	127.5	117	–	117	+ 10.5	2.5	13	- 10.5	–
1958/59	134	120	–	120	+ 14	3.5	17.5	- 14	–
1959/60	125	118	–	118	+ 7	8	15	- 7	–
1965	4/ 167	134	–	134	+ 33	5	38	- 33	–
1975 A	4/ 206	160	–	160	+ 46	5	51	- 46	–
1975 B	4/ 192	160	–	160	+ 32	5	37	- 32	–

1/ Surplus (+) or deficit (-). 2/ Net exports (-) or net imports (+). 3/ Increase (+) or decrease (-) in stocks. 4/ Total output minus exports of nonslaughter animals in 1960 (9,400 metric tons of meat equivalent) minus tallow (15 kilograms per head of cattle slaughtered domestically).

Table 145. — Supply-demand balance for pork (excluding lard), 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance		Change in stocks 3/
							Foreign trade exports	Balance 2/	
	1,000 metric tons								
1934-38	157	190	–	190	-33	33	–	+ 33	–
1950/51	136.5	145	–	145	- 8.5	7.5	–	+ 7.5	- 1
1951/52	133	137.5	–	137.5	- 4.5	8	–	+ 8	+ 3.5
1952/53	158	161	–	161	- 3	2	0.5	+ 1.5	- 1.5
1953/54	165	165.5	–	165.5	- 0.5	1	2.5	- 1.5	- 2
1954/55	164.5	176	–	176	- 11.5	12.5	0.5	+ 12	+ 0.5
1955/56	181	188	–	188	- 7	8	0.5	+ 7.5	+ 0.5
1956/57	179.5	193.5	–	193.5	- 14	14.5	–	+ 14.5	+ 0.5
1957/58	193	196	–	196	- 3	8.5	2.5	+ 6	+ 3
1958/59	203	218	–	218	- 15	15	–	+ 15	–
1959/60	202.5	221	–	221	- 18.5	19	–	+ 19	+ 0.5
1965	4/ 253	238	–	238	+ 15	4	19	- 15	–
1975 A	4/ 295	271	–	271	+ 24	2	26	- 24	–
1975 B	4/ 280	271	–	271	+ 9	2	11	- 9	–

1/ Surplus (+) or deficit (-). 2/ Net exports (-) or net imports (+). 3/ Increase (+) or decrease (-) in stocks. 4/ Total output minus backfat, etc. for lard (15.4 percent of carcass weight) for domestic consumption.

Table 146. — Supply-demand balance for poultry meat, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance		Change in stocks 3/
							Foreign trade exports	Balance 2/	
	1,000 metric tons								
1934-38	4	8	–	8	- 4	4	–	+ 4	–
1950/51	3	3.5	–	3.5	- 0.5	0.5	–	+ 0.5	–
1951/52	3	3	–	3	0	0	–	0	–
1952/53	5	5	–	5	0	0	–	0	–
1953/54	5	5	–	5	0	0	–	0	–
1954/55	5	5.5	–	5.5	- 0.5	0.5	–	+ 0.5	–
1955/56	6	7	–	7	- 1	1	–	+ 1	–
1956/57	7.5	9	–	9	- 1.5	1.5	–	+ 1.5	–
1957/58	8	9.5	–	9.5	- 1.5	1.5	–	+ 1.5	–
1958/59	11	14.5	–	14.5	- 3.5	3.5	–	+ 3.5	–
1959/60	14	19.5	–	19.5	- 5.5	5.5	–	+ 5.5	–
1965	19	24	–	24	- 5	5	–	+ 5	–
1975	24	31	–	31	- 7	7	–	+ 7	–

1/ Surplus (+) or deficit (-).

2/ Net exports (-) or net imports (+).

3/ Increase (+) or decrease (-) in stocks.

2. 6 Prospects for Feedstuffs

According to the feed balance already developed in Chapter VI, domestic feed production will fall short of requirements on the basis of projected trends of plant and animal production and under an assumption of a constant feed conversion rate. Imports will increase from 0.65 million metric tons of grain equivalent in 1960 to 1.13 million metric tons in 1965, and will range from 1.31 million metric tons (Projection B) to 1.78 million metric tons (Projection A) in 1975. Under the assumption of unchanged relative import prices of the various feedstuffs, in 1965 1 million metric tons of foreign feed grain will be needed, and between 1.2 million metric tons (Projection B) and 1.6 million metric tons (Projection A) in 1975. About three-fourths to four-fifths will probably consist of corn and the rest of barley (table 149).

The projected level of demand for feed imports appears to be unreasonably high at first sight. In order to estimate the possible range of error, an alternative projection of import requirements was calculated under the assumption that domestic crop production would develop at a higher rate than previously assumed. If the projected yields per hectare of bread grains, feed grains, potatoes, fodder beets, clover, and hay (see Chapter IV, part 1) are raised by 5 percent for 1965, and by 10 percent for 1975, total domestic feed production would amount to 6.09 million metric tons in 1965 (originally projected at 5.74 million metric tons) and to 6.82 million metric tons in 1975 (originally 6.28 million metric tons). If animal production develops in line with the projections, the resulting import demand would amount to 0.78 million metric tons in 1965 (originally projected at 1.13 million metric tons), and import requirements in 1975 would range from 0.76 million metric tons according to Projection B (originally, 2.31 million metric tons) to 1.24 million metric tons according to Projection A (originally, 1.78 million metric tons). Even though future development of domestic feed production is optimistic, future import requirements for feedstuffs will be higher than in the past. Import demand for feedstuff will be considerably lower only if the volume of livestock develops at a slower rate than expected. The output projections for 1965 and for 1975 (Projection B), however, represent very conservative estimates and will fail to be achieved only in the case of serious marketing difficulties, especially on foreign markets.

2. 7 Prospects for Tobacco

Total tobacco consumption (in terms of raw tobacco) increased continuously from 7,824 metric tons in 1950 (excluding black market purchases) to 10,750 metric tons in 1960 (37 percent). Only in 1954 did consumption of tobacco temporarily decline. In the short-run, there are large disproportions between production and sales. Annual production fluctuated between 9,000 metric tons (1954) and 10,200 metric tons (1958 and 1959). The import of foreign tobacco products increased from 1 metric ton in 1950 to 376 metric tons in 1960 but still amounted to only 3.5 percent of total consumption.

The demand for raw tobacco is mainly met by foreign suppliers. Since the Austrian Tobacco Company holds large quantities of raw tobacco in stock in order to compensate for short-run price fluctuations — normally about one-half of total annual requirements is held in stock — imports of raw tobacco fluctuated between 7,100 metric tons in 1960 and 14,000 metric tons in 1956. In 1959, only 700 metric tons of domestically grown tobacco were processed.

Table 147. – Supply-demand balance for lard and tallow, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses 1/	Total	Balance 2/	Imports	Distribution of balance		Change in stocks 4/
							Foreign trade exports	Balance 3/	
					1,000 metric tons				
1934-38	39	62	2	64	- 25	26	1	+ 25	–
1950/51	36.5	66	9.5	75.5	- 39	20	0.5	+ 19.5	-19.5
1951/52	36	56.5	8.5	65	- 29	32.5	–	+ 32.5	+ 3.5
1952/53	37	55.5	8.5	64	- 27	28	–	+ 28	+ 1
1953/54	36.5	52	7	59	- 22.5	11.5	–	+ 11.5	-11
1954/55	36.5	52.5	7	59.5	- 23	23.5	–	+ 23.5	+ 0.5
1955/56	38.5	49.5	6.5	56	- 17.5	22	–	+ 22	+ 4.5
1956/57	38	49.5	6	55.5	- 17.5	14	–	+ 14	- 3.5
1957/58	40.5	46.5	3.5	50	-9.5	9.5	–	+ 9.5	–
1958/59	36	41.5	4	45.5	- 9.5	8.5	–	+ 8.5	- 1
1959/60	32	34.5	5	39.5	- 7.5	6	–	+ 6	- 1.5
1965	36	32.5	4.5	37	- 1	1	–	+ 1	–
1975 A	39.5	30.5	9.5	40	- 0.5	0.5	–	+ 0.5	–
1975 B	39.5	30.5	9.5	40	- 0.5	0.5	–	+ 0.5	–

1/ Industrial use. 2/ Surplus (+) or deficit (-). 3/ Net exports (-) or net imports (+). 4/ Increase (+) or decrease (-) in stocks.

Table 148. – Supply-demand balance for eggs, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Production	Food	Consumption, other uses	Total	Balance 1/	Imports	Distribution of balance		Change in stocks 3/
							Foreign trade exports	Balance 2/	
					1,000 metric tons				
1934-38	40	45	–	45	- 5	5	–	+ 5	–
1950/51	30	33.5	–	33.5	- 3.5	3.5	–	+ 3.5	–
1951/52	30	34	–	34	- 4	4	–	+ 4	–
1952/53	38	40.5	–	40.5	- 2.5	2.5	–	+ 2.5	–
1953/54	49	51	–	51	- 2	2	–	+ 2	–
1954/55	50	52	–	52	- 2	2	–	+ 2	–
1955/56	55	57	–	57	- 2	2	–	+ 2	–
1956/57	62.5	66	–	66	- 3.5	3.5	–	+ 3.5	–
1957/58	66.5	70	–	70	- 3.5	3.5	–	+ 3.5	–
1958/59	66.5	70.5	–	70.5	- 8	8	–	+ 8	–
1959/60	68.5	81	–	81	-12.5	12.5	–	+12.5	–
1965	75	87	–	87	-12	12	–	+12	–
1975	89	96	–	96	- 7	7	–	+ 7	–

1/ Surplus (+) or deficit (-).
2/ Net exports (-) or net imports (+).
3/ Increase (+) or decrease (-) in stocks.

Table 149. — Animal feed requirements, domestic production and imports, 1934-38/1959, and projections for 1965 and 1975, Austria

Year	Total requirements	Domestic production	Imports
	1,000 metric tons of grain equivalent		
1934-38	4,949	4,402	547
1950	4,057	3,794	263
1951	4,246	3,885	361
1952	4,266	3,752	514
1953	4,836	4,490	346
1954	5,095	4,722	373
1955	5,340	4,750	590
1956	5,463	5,011	452
1957	5,525	4,988	537
1958	5,606	5,118	488
1959	5,471	4,998	473
1965	6,870	5,742	1,128
1975 A	8,062	6,278	1,784
1975 B	7,586	6,278	1,308

Table 150. — Total tobacco consumption and imports of raw tobacco, 1950-1960 and projections for 1965 and 1975, Austria

Year	Consumption of tobacco products 1/	Imports of raw tobacco
	Metric tons	
1950	7,824	7,891
1951	8,506	9,588
1952	8,760	9,725
1953	8,880	10,324
1954	7,987	7,581
1955	8,820	9,389
1956	9,524	14,008
1957	9,838	12,412
1958	10,348	10,040
1959	10,652	8,260
1960	10,750	7,133
1965	11,481	10,000
1975	12,755	11,000

1/ Sales by the "Tabakregie" of domestic and imported brands in terms of raw material equivalent.

Total tobacco consumption is projected at 11,480 metric tons in 1965, and at 12,755 metric tons in 1975, which is 7 percent and 19 percent respectively, above the 1960 level. Under the assumption that the share of foreign tobacco products in total consumption will remain at its present level, the projected total demand of raw tobacco will be approximately 11,000 metric tons in 1965 and 12,200 metric tons in 1975. Since domestically produced tobacco can only be used up to a proportion of 10 percent, import requirements for crude tobacco should reach a level of at least 10,000 metric tons in 1965, and 11,000 metric tons in 1975 (table 150).

3. Dependence of Food Supply and of Agricultural Production on Foreign Trade

Austrian agriculture in the past has not met the food demand of the population. Various products, like rice, citrus fruit, and oilseeds of course cannot be grown for climatic reasons and have to be imported. There is also a strong seasonal demand for potatoes, prime vegetables, and early fresh fruit, which ripen later in Austria than in southern countries. Considerable amounts of bread grain as well as smaller quantities of meat (particularly poultry, and partly pork) and eggs have also been purchased from abroad. Aside from supplementary products which complement the domestic food supply, various commodities such as cheese have also been imported which compete with domestic products.

The highest degree of self-sufficiency in agricultural products was achieved in 1958/59 when 83.2 percent of the total domestic volume of food requirements (consumption at constant average retail prices of the period from 1952-53 to 1956-57) was supplied by indigenous production (table 151). In terms of calories, the degree of self-sufficiency amounted to 80 percent. The difference between the results obtained by either means of calculation (in terms of volume or in terms of energy value) arises from the fact that the demand for relatively expensive animal products (meat, eggs, cheese) was covered to a higher degree by domestic sources than the demand for relatively cheap products rich in calories (particularly bread grain).

Studies of the degree of self-sufficiency by individual commodities yields the following results: Consumption of fresh milk, butter, and cream was entirely met by domestic supplies. Of the consumption of beef and veal, sugar, and potatoes, 90 percent were supplied by domestic producers. The degree of self-sufficiency amounted to 89 percent in fruit and eggs, 87 percent in vegetables, 86 percent in cheese, and 79 percent in flour. These figures refer to the actual indigenous food use of domestic foodstuffs and do not include the quantities stockpiled or exported (table 152). In 1958-59, for example, 4,000 tons of foreign cheese were imported, but at the same time, 7,000 tons of domestic cheese were exported. Similarly, domestic sugar production was also larger than consumption, but part of the output had to be put in stocks since earlier import contracts were still in effect. If the total volume of domestic food production — independent from its use (domestic consumption, storage, or exports)— is compared with total domestic consumption (for food and other purposes), it becomes evident that the degree of self-sufficiency in 1958-59 had reached 89.2 percent (tables 151 and 153).

During the fifties, production of food commodities rose faster than domestic consumption. Production increased at an annual rate of 3.4 percent, while the growth rate of

Table 151. - Degree of self-sufficiency in total food requirements with gross-net comparisons, 1934-38/1959-60, and projections for 1965 and 1975, Austria

Year	Gross 1/	Net 2/
	Percentage share of domestic production	
1934-38	79.2	84.1
1950/51	76.2	82.3
1951/52	79.2	83.3
1952/53	83.6	85.3
1953/54	82.6	89.4
1954/55	80.1	83.8
1955/56	81.7	84.7
1956/57	81.9	87.2
1957/58	80.8	88.1
1958/59	83.2	89.2
1959/60	78.1	84.7
1965	83.3	90.4
1975 A	84.3	92.2
1975 B	-	89.5

1/ Quantities from indigenous production used for domestic human consumption (according to table 152, but including rice, fish, and nuts) as percentage share in total domestic food requirements, weighted at constant consumer prices of 1952-56.

2/ Output of important food commodities (according to table 153) as percentage share in total domestic requirements (for human consumption and for other uses), weighted at constant consumer prices of 1952-56.

Table 152. – Gross degree of self-sufficiency in important food commodities, 1934-38/1959-60, Austria 1/

Commodity	1934-38	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
	Domestic production (including imported feed) as percentage of total consumption										
Flour	67.0	44.4	54.0	62.3	68.0	62.4	68.1	79.9	74.3	78.5	72.0
Cereal preparations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.6	55.6
Fats and oils, total 2/	48.9	47.4	49.3	54.7	53.3	51.9	52.4	50.2	51.6	48.8	44.6
of which Butter	100.0	96.0	98.0	98.2	100.0	96.7	86.1	96.8	100.0	100.0	100.0
Vegetable oils	2.9	4.9	4.6	14.3	13.0	10.2	12.2	9.7	7.9	8.5	5.2
Marine oils	–	–	–	–	–	–	–	–	–	–	–
Lard and tallow	58.1	53.0	59.3	62.2	64.4	65.7	73.7	72.7	82.8	81.9	82.6
Meat, total	83.6	95.8	95.3	99.0	99.7	94.4	95.6	93.7	95.8	93.6	90.3
of which Beef	88.6	96.1	96.8	99.4	100.0	97.1	96.6	96.7	98.4	96.9	91.8
Veal	89.5	100.0	100.0	100.0	100.0	98.2	94.1	93.9	95.8	97.8	100.0
Pork	82.6	94.8	94.2	98.8	99.4	92.9	85.7	92.5	95.7	93.1	91.4
Poultry	50.0	85.7	100.0	100.0	100.0	90.9	85.7	83.3	84.2	75.9	71.8
Other meat	70.6	100.0	89.7	96.7	100.0	87.9	93.1	93.3	86.7	86.2	76.7
Eggs	88.9	89.6	88.2	93.8	96.1	96.2	96.5	94.7	95.0	88.7	84.6
Whole milk	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cream	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Condensed and dried milk	–	–	–	66.7	40.0	50.0	22.2	42.9	53.8	100.0	100.0
Cheese and cottage cheese	96.0	96.8	94.4	95.1	95.2	91.1	83.0	86.2	83.1	86.0	90.2
Sugar	98.8	48.6	71.4	88.8	59.9	83.9	93.8	72.5	83.9	92.5	99.2
Potatoes	97.1	98.1	97.2	98.4	97.8	93.3	97.6	97.3	96.8	95.8	95.2
Vegetables	92.3	93.4	94.1	93.9	93.2	87.6	89.3	87.8	88.4	86.9	85.4
Fresh fruit	73.3	95.5	89.0	89.0	82.3	77.5	78.7	80.8	56.3	89.1	61.6
Citrus fruit	–	–	–	–	–	–	–	–	–	–	–
Honey	66.7	87.5	66.7	80.0	85.7	62.5	42.9	36.4	80.0	66.7	61.5
Pulses	60.0	44.4	36.4	44.4	40.0	57.1	40.0	18.2	27.3	33.3	26.7

1/ For the purpose of this survey, the quantities from domestic production used for indigenous human consumption (which is not identical to total domestic output) have been related to total domestic food requirements.

2/ Pure fat content.

consumption (in terms of agricultural raw products) amounted to only 2.9 percent. The degree of self-sufficiency has, therefore, shown a slowly rising tendency, apart from the annual fluctuations due to particular harvest conditions. The proportion of imports has also declined slightly. In 1950-51, the degree of gross self-sufficiency of 76 percent was still below the prewar level of 79 percent, but in the midfifties it had risen to about 80 percent and reached a peak level of 83 percent in 1958-59. In 1959-60, the degree of self-sufficiency fell back to 78 percent due mainly to poor harvests. In particular, the demand for sugar and bread grain has increasingly been met from domestic sources. The consumption of poultry, on the other hand, has become more dependent on imports. Demand for oilseed imports has also increased since domestic production cannot be expanded significantly. In general, the net percentages of self-sufficiency showed the same development as the gross percentages, but on the average they were between 4 and 6 points higher.

The trend toward increasing self-sufficiency in food requirements is expected to continue. As a result of the projections, the annual growth rate of agricultural output is estimated at 1.9 percent until 1965, and between 1.4 and 1.7 percent for the following 10 years. The annual growth rate of food consumption (in terms of agricultural raw products) will amount to 1.3 percent throughout this period. The dependence on foreign supplies will thus decrease considerably by 1965. According to the results of this study, during the next 5 years food consumption will grow at a much lower rate than in the fifties, whereas domestic food production still will develop at a relatively high rate. Under the assumption of medium harvests the degree of gross self-sufficiency in food will reach 83.3 percent by 1965, and 84.3 percent (Projection A) by 1975. Net self-sufficiency (including exports) will be 90.4 percent in 1965, and 92.2 percent (Projection A) in 1975. The divergent development of production and consumption is more clearly expressed by the net percentages since a substantial part of production increases (primarily of meat) will not complement imports, but will have to be exported.

These results indicate that in the target years output of food commodities which can be produced domestically will meet the volume of demand except for a few commodities like eggs and poultry and will even allow for large exports (particularly of live animals and meat). Total agricultural exports, however, will be smaller than the imports of those commodities which cannot be produced in Austria, or which can be supplied only during limited seasons. Demand for citrus fruit and vegetable fat is increasing at an unusually fast rate. Only in years of top harvests could domestic food production reach about the overall volume of domestic demand. Even then it is questionable whether there would be a surplus of important products for export.

Similar results are arrived at if food imports and exports are analyzed. For this purpose, feedstuffs, breeding and other nonslaughter animals, as well as "stimulants" were excluded from Section O (Food) of the SITC-Code, and certain fats for food use and raw materials for fat production were added. In order to achieve comparability with the projections of production and consumption, the quantities of the various commodities (five-digit-items of the SITC-Code) were valued at constant average import and export prices of the period from 1952 to 1956.

According to this calculation, food exports rose sharply during the fifties and amounted in 1960 to AS 0.97 billion (at constant f. o. b. prices of 1952-56) which is more than 2.5

times the prewar level (AS 0.38 billion). In 1960, food exports reached about one-fourth of the volume of food imports compared with only one-ninth in 1937. Imports of foodstuffs showed no uniform trend during the Fifties although they were somewhat higher in the second half of the past decade than in the first. The particularly large imports in 1959 and 1960 (AS 3.91 billion, and AS 3.88 billion at constant c. i. f. prices of 1952-56 as compared to less than AS 3 billion in the preceding years) were caused by the mediocre harvest in 1959 and the subsequent purchases to replenish inventories. During the fifties, net imports fluctuated between AS 1.95 billion (1954) and AS 3.00 billion (1959) but were always lower than before the war (AS 3.22 billion in 1937) (table 154).

On the basis of projections of production and consumption of important food commodities, which in 1960 accounted for 91 percent of all food exports and 83 percent of all food imports, the volume of net imports will decline in the future and will, assuming a medium harvest, amount to only AS 1.73 billion in 1965. This will be much lower than in recent years or during the prewar period. An improvement of Austria's balance of trade can be expected by the projected marked increase of agricultural exports. The import demand estimated at AS 3.16 billion in 1965 will be lower than in 1959 and 1960, but somewhat higher than in the years before. Through 1975, the import surplus will further decrease to AS 1.23 billion according to the optimistic projection (Projection A). According to the more pessimistic version (Projection B), net imports may amount to AS 2.31 billion in 1975 which will be higher than in 1965, but still lower than during the past years or in 1937 (table 155).

Imports of livestock and meat and above all, of bread grain are expected to decline sharply whereas substantially more fruit (primarily citrus), vegetables, vegetable fats will be imported than at present. The concentration of exports on livestock and meat will be much stronger than it has been up to the present. In 1960, livestock and meat (excluding animals for breeding and other nonslaughter uses) accounted for 43 percent of total food exports. According to the optimistic projection (Projection A) this proportion will rise to almost 70 percent by 1975.

The general statement that the net degree of self-sufficiency in food will exceed 90 percent by 1975, and that Austria's agricultural output as a whole will almost meet domestic demand, has to be modified. First, the high and still increasing degree of self-sufficiency applies only to foodstuffs, and not to "stimulants." The import of agricultural commodities which are mainly used for stimulants (wine, tobacco, coffee, tea, cocoa, and spices) has more than doubled its prewar level and is expected to continue to rise strongly in the future. In 1960, the import surplus of these products reached a level of AS 1.19 billion (at 1952-56 prices) as compared with only AS 0.53 billion in 1937.

It should also be stressed that the expected high level of indigenous agricultural output can only be achieved if larger quantities of feedstuffs and technical means of production are used (fertilizers, pesticides, and machines), substantial proportions of which have to be procured by imports. The dependence of agriculture on imported means of production cannot be assessed precisely because in foreign trade statistics the individual items are not grouped according to their usage but according to their material properties. On the basis of a rough grouping, however, the total value (at current cost to producers) of feeds, fertilizers, tractors, agricultural machines, seeds, pesticides, and breeding animals imported in 1960 amounted to almost 16 percent of the agricultural gross output. This value of imports includes fertilizers (superphosphate) and feeds (oilcakes, milling by-products) which are domestically produced from imported raw materials, crude phosphates, oilseeds, and bread grain. So far, the import/output ratio (imports of means of production as percentage of gross output) has been lower than before the war (18.6 percent) but during the fifties it showed a clearly rising tendency.

The dependence of agricultural production on imports is expected to increase further. In 1975, fertilizer consumption will be about 90 percent above 1960 (see Chapter IV, part 1) and according to Chapter VI import requirements for feedstuffs will be approximately 100 to 170 percent higher than in 1960. If it is assumed that the sales of new tractors (see Chapter III, part 3) will first decline, but later increase again (gradual beginning of replacement investments), by 1975 the import/output ratio will reach 20.4 to 23.9 percent (table 156). For this calculation it was assumed that somewhat fewer agricultural machines and only about the same quantity of "other production means" will be imported. In contrast, the export/output ratio (exports of agricultural products as percentage of gross output) will, in spite of the expected sharp rise of exports, be less than half of the import/output ratio and range from 7.9 to 10.6 percent (table 157).

No substantial change is projected in the total import surplus in agricultural products, including food commodities, stimulants, feedstuffs, and breeding animals, but excluding industrial raw materials. The decline of net food imports is expected to range from AS 0.5 to 1.5 billion, and will largely be offset by the sharply increasing demand for feed imports. According to the feed balance, import requirements for feeds will rise even more strongly and net food imports are expected to decline. However, the underlying estimates for feed requirements may be slightly high. If the increasing trend in the import surplus of surplus of stimulants 97/ is taken into account, total net imports of agricultural products (excluding raw materials for industrial purposes) may be estimated at approximately AS 5 billion, which would be the same as in 1960 and in 1937 following a temporary decrease during the first half of the sixties.

97/ Among the stimulants of agricultural origin, projections were made only for tobacco and partly for wine. These few data, however, are not sufficient to be used as a basis for projecting Austria's total foreign trade in stimulants.

Table 153. – Net degree of self-sufficiency in important food commodities, 1934-38/1959-60, Austria 1/

Commodity	1934-38	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
	Domestic production (excluding imported food)as percentage of total consumption										
Bread grain	73.8	57.5	62.0	66.0	77.3	68.1	74.3	83.1	79.0	78.0	79.1
Edible oils	2.0	3.8	3.6	9.4	7.3	5.8	8.5	7.6	6.3	6.8	4.5
Lard and tallow	60.9	48.3	55.4	57.8	61.9	61.3	68.8	68.5	81.0	79.1	81.0
Meat, total	83.6	95.5	96.7	98.6	103.9	95.3	97.1	96.8	101.3	98.4	94.6
of which Beef and veal	88.8	96.9	97.4	99.5	110.8	98.7	99.1	103.9	109.0	111.7	105.9
Pork	82.6	94.1	96.7	98.1	99.7	93.5	96.3	92.8	98.5	93.1	91.6
Poultry	50.0	85.7	100.0	100.0	100.0	90.9	85.7	83.3	84.2	75.9	71.8
Other meat	80.0	100.0	93.2	97.8	102.2	93.8	97.8	100.0	93.6	93.2	84.4
Eggs	88.9	89.6	88.2	93.8	96.1	96.2	96.5	94.7	95.0	88.7	84.6
Milk and dairy products 2/	105.9	99.6	100.0	99.6	102.4	100.8	93.8	104.0	108.2	108.1	105.6
Sugar	98.8	61.1	75.9	69.2	88.2	94.5	81.3	80.9	100.8	104.1	106.2
Potatoes	99.5	99.4	99.1	99.3	100.6	98.2	99.3	99.4	100.0	99.3	98.6
Vegetables	93.8	94.9	95.2	95.1	94.7	90.2	91.4	90.6	90.9	89.6	88.5
Fruit and southern fruit (Excluding citrus)	87.5	99.1	94.5	95.1	90.8	81.2	90.5	90.2	70.6	95.1	72.6
Citrus fruit	–	–	–	–	–	–	–	–	–	–	–
Honey	66.7	87.5	66.7	80.0	85.7	62.5	42.9	36.4	80.0	66.7	61.5
Pulses	76.0	73.7	66.7	73.7	62.5	76.9	66.7	55.6	58.8	58.8	42.1

1/ For the purpose of this survey, total indigenous output (regardless of utilization) has been related to total domestic requirements (for human consumption and for other uses).

2/ Cream, condensed and dried milk, butter, cheese converted into milk.

Table 154. – Foreign trade in agricultural commodities grouped as to food, feedstuffs, stimulants, and livestock, 1937-1960, and projections for 1965 and 1975, Austria

Year	Food 1/			Beverages, tobacco, etc. 2/			Feedstuffs 3/			Cattle for breeding and other nonslaughter uses			All agricultural products		
	Imports	Exports	Balance	Imports	Exports	Balance	Imports	Exports	Balance	Imports	Exports	Balance	Imports	Exports	Balance
	Million AS at constant prices of 1952-56														
1937	3,593.0	377.4	-3,215.6	585.7	52.4	-533.3	1,198.0	2.6	-1,195.4	1.3	68.0	+ 66.7	5,378.0	500.4	-4,877.6
1940	3,089.9	162.0	-2,927.9	549.3	112.4	-436.9	568.8	22.9	- 545.9	8.3	67.8	+ 59.5	4,216.3	365.1	-3,851.2
1951	2,742.8	87.3	-2,655.5	623.9	43.7	-580.2	781.9	4.7	- 777.2	0.3	33.7	+ 33.4	4,148.9	169.4	3,979.5
1952	2,623.4	42.1	-2,581.3	609.6	34.8	-574.8	1,105.1	7.0	-1,098.1	0.5	19.4	+ 18.9	4,338.6	103.3	-4,235.3
1953	2,382.8	214.7	-2,168.1	647.8	45.2	-602.6	772.0	17.9	- 754.1	0.7	56.1	+ 55.4	3,803.3	333.9	-3,469.4
1954	2,347.2	401.7	-1,945.5	612.6	36.1	-576.5	821.5	23.5	- 798.0	0.8	54.9	+ 54.1	3,782.1	516.2	-3,265.9
1955	3,010.0	182.5	-2,827.5	725.0	55.7	-669.3	1,292.4	15.7	-1,276.7	6.6	38.0	+ 31.4	5,034.0	291.9	-4,742.1
1956	2,879.1	402.7	-2,476.4	1,000.0	73.5	-926.5	986.2	12.6	- 973.6	0.2	120.2	+120.0	4,865.5	609.0	-4,256.5
1957	2,890.8	719.3	-2,171.5	1,105.7	63.6	-1,042.1	1,165.5	8.1	-1,157.4	0.1	214.4	+214.3	5,162.1	1,005.4	-4,156.7
1958	2,961.7	910.5	-2,051.2	990.6	46.2	-944.4	1,077.8	21.6	-1,056.2	0.7	187.2	+186.5	5,030.8	1,165.6	-3,865.3
1959	3,908.2	909.1	-2,999.1	1,034.1	46.1	-988.0	1,023.8	37.7	- 986.1	0.9	195.8	+194.9	5,967.0	1,188.7	-4,778.3
1960	3,875.5	974.8	-2,900.7	1,231.0	37.1	-1,193.9	1,392.2	23.9	-1,368.3	10.7	209.2	+198.5	6,509.4	1,245.0	-5,264.4
1965	3,160.0	1,430.0	-1,730.0	–	–	–	2,360.0	20.0	-2,340.0	10.0	210.0	+200.0	–	–	–
1975 A	3,240.0	2,010.0	-1,230.0	–	–	–	3,680.0	20.0	-3,660.0	10.0	210.0	+200.0	–	–	–
1975 B	3,490.0	1,180.0	-2,310.0	–	–	–	2,790.0	20.0	-2,770.0	–	–	–	–	–	–

1/ SITC-Code, Section O, excluding feedstuffs, cattle for breeding and other nonslaughter uses, coffee, tea, etc. (07), part of oil seeds (22), and part of animal and vegetable oils and fats (4).

2/ Coffee, cocoa, etc., chocolate, tea, spices, wine from grapes, tobacco and manufactures thereof (SITC-Code 07, 112, -01, 12).

3/ Feed grain and other feedstuffs.

Table 155. – Imports and exports of food, by commodities, 1960, and projections for 1965 and 1975, Austria

Commodity	IMPORTS				EXPORTS			
	1960	1965	1975 A	1975 B	1960	1965	1975 A	1975 B
	Million AS at constant prices of 1952-56							
Livestock and meat	595.0	295.6	285.5	285.5	417.2	1,040.8	1,404.4	898.0
Milk	28.0	–	–	–	172.6	80.7	80.7	80.7
Butter	0.1	–	–	206.3	135.8	–	86.5	–
Cheese	46.6	90.0	90.0	90.0	120.3	109.3	159.0	–
Eggs	170.4	175.6	102.4	102.4	–	–	–	–
Bread grain	556.4	192.8	69.8	69.8	–	–	–	–
Potatoes	29.0	21.1	21.1	21.1	4.5	9.1	9.1	9.1
Fresh fruit	681.0	634.8	719.4	719.4	14.0	32.9	46.1	46.1
Citrus fruit	328.3	415.4	536.6	536.6	–	–	–	–
Vegetables	196.3	210.8	238.9	238.9	25.4	30.3	42.4	42.4
Fats incl. raw materials	600.0	583.8	623.1	623.1	–	–	–	–
Other	644.4	540.1	553.2	596.9	85.0	126.9	181.8	103.7
Total	3,875.5	3,160.0	3,240.0	3,490.0	974.8	1,430.0	2,010.0	1,180.0

Table 156. – Import dependence of agricultural production, by types of imported inputs, 1937-1960, and projections for 1965 and 1975, Austria 1/

Year	Agricultural output	Imported inputs						Import inputs as percentage of output
		Fertilizers 2/	Feedstuffs 3/	Tractors	Farm machinery	Other means of production	Total	
	Million AS at current buyer cost							
1937	1,172	26.5	172.3	0.8	4.2	13.7	217.5	18.6
1952	13,526	158.8	902.7	24.3	109.1	90.0	1,284.9	9.5
1956	15,781	278.9	1,054.5	90.2	303.8	141.9	1,869.3	11.8
1960	19,121	466.0	1,493.8	138.3	633.2	166.9	2,958.2	15.5
1965 4/	21,192	615	2,600	80	600	167	4,062	19.2
1975 A 4/	24,467	892	4,090	150	550	167	5,849	23.9
1975 B	23,411	892	3,010	150	550	167	4,769	20.4

1/ Estimates of the Institute.
2/ Including fertilizers manufactured of imported raw phosphates.
3/ Including milling byproducts and oilcake manufactured of imported grain and oil seeds.
4/ At prices of 1960. The imports of "other means of production" were assumed to remain at the 1960 level.

Table 157. - Export dependence of agricultural production, by types of exported products, 1937-1960, and projections for 1965 and 1975, Austria 1/

Year	Agricultural output	Exports						Exports as percentage of output
		Live animals 2/	Dairy products 3/	Fruit and vegetables	Wine	Other	Total	
				Million AS at current prices				
1937	1,172	12.7	25.6	3.9	0.3	6.5	49.0	4.2
1952	13,526	26.4	2.8	13.0	6.8	26.6	75.6	0.6
1956	15,781	303.1	136.1	61.6	31.0	85.0	616.3	3.9
1960	19,121	755.2	346.7	59.6	21.0	107.4	1,289.9	6.7
1965 4/	21,192	1,601	248	54	35	77	2,015	9.5
1975 A 4/	24,467	2,016	366	64	45	92	2,583	10.6
1975 B	23,411	1,480	194	64	45	77	1,860	7.9

1/ Estimates of the Institute.
2/ Including meat and meat preparations.
3/ Including eggs and honey.
4/ At 1960 prices.